Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

EDITORS

A. W. ANDERSON, Chief, Branch of Commercial Fisheries

DONALD Y. ASKA, Chief, Educational and Market Development Section

ASSOCIATE EDITOR

MAURICE E. STANSBY, Chief, Pacific Coast and Alaska Technological Research

ASSISTANT EDITOR

ROY C. STEVENS, Fishery Products Technologist, Seattle

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In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
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4	Oils	9	Miscellaneous

Issued with the approval of the Bureau of the Budget, December 29, 1953

4.5 AUTOXIDATION OF UNSATURATED FATTY ACIDS

Nikkila, Olavi E.
Eripainos Suomen Kemistilehdesta A 27, 131-136 (1954)

The development of rancidity in products containing unsaturated fatty acids has long been subject to much investigation. The autoxidation of unsaturated glycerides is probably the most common form of rancidity and that which usually is meant when references are made to the "rancid" flavour of an edible fat. The typical sharp, unpleasant odor of rancidity is believed to be chiefly due to the presence of aldehydes of medium molecular weight, and particularly heptylic and nonylic aldehydes. Such compounds may be formed by the oxidation and rupture of a fatty acid chain at a double bond.

The decrease in the unsaturation during the autoxidation of unsaturated compounds was taken as an indication that the primary reaction was an addition of an oxygen molecule to a double bond forming a cyclic peroxide, as proposed by Engler and Bach in the last century. Then the labile peroxides decompose yielding aldehydes as primary products.

This view seems to have been generally accepted till the beginning of this century. Hereafter numerous new hypothesis have been put forth. Actually most of them are modifications of the original peroxide theory. However, Farmer and co-workers have suggested that autoxidations of unsaturated fatty acids all proceed by attack at an α-methylene group by a free radical mechanism. The chain reaction is started by the removal of a hydrogen atom from an α-methylenic position followed by the chain cycle. Through mesomerism of the supposed intermediate free radicals that are produced by removal of a hydrogen atom from the α-methylene group at either C-8 or C-11 in the case of oleic acid, there are four positions, where the oxygen can react, giving hydroperoxide groups at carbon atoms 8, 9, 10 or 11.

(over)

 Author's summary

4.4 SOME FACTORS AFFECTING THE DECOMPOSITION OF FRYING FATS

Carlin, G. T.; Hopper, R. P.; and Rockwood, B. N.
Food Technology 8, No. 3, 161-165 (March 1954)

Hydrolysis, polymerization, and oxidation are three general chemical reactions which take place simultaneously when fats are subjected to elevated frying temperatures. In the past, most attention has been focused on the hydrolysis reaction, probably because of the ease of measurement of free-fatty-acid development. According to the present investigations, the oxidation of hot-frying fat is a much more important aspect of the problem than was formerly recognized and the problem of hydrolysis may be of secondary importance.

Consideration of examples of improperly planned frying operations calls attention to several questions that have to do with thermal reactions of frying fats.

1. What is the influence of air on the stability of fats held at frying temperatures?
2. Is decomposition, caused by excessive heat and by oxidation, of greater importance with respect to frying fat stability than hydrolytic action due to the presence of moisture?
3. What substances are responsible for the foaming tendencies of heated fats?
4. Are these substances responsible for changes in frying properties of fats?
5. Would removal of the air-fat interface result in increased stability in frying fat?

Tests were arranged to study several of these questions. Electrically heated deep fat fryers of 25-pound capacity were regulated thermostatically at 360° F. ± 5° (182° C. ± 2.8°). Hydrogenated cottonseed oil was used as the frying fat. The fat of one kettle was protected from exposure to air by means of a metal float or "boat" constructed to cover the surface of the frying fat to within 1/4-inch of the edge of the kettle. The fat in the second kettle was permitted to stand unprotected from the

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 ABSTRACTER: Kathryn L. Osterhaug

6.139 THE NUTRITIVE VALUE OF HERRING MEALS. 1. THE EFFECT OF HEAT

Tarr, H. L. A.; Biely, J.; and March, B. E.
Poultry Science 33, No. 2, 242-250 (March 1954)

The authors attempted to determine with accuracy the degree of heating to which herring meal could be subjected before its nutritive value was impaired and the reason for this impairment.

Herring meals were prepared from whole herring (Clupea pallasii) presscake at different seasons and by different methods of drying. Commercial flame-dried meals were prepared by cooking, pressing, and drying the crumbled presscake in a direct flame dryer. Low-temperature-dried meals were prepared by cooking, pressing, and drying the crumbled presscake at 37-43° C. in rapidly moving air for about 24 hours. Additional heating of the low-temperature meals was accomplished by tumbling 10-pound lots of these meals in an electrically-heated stainless steel drum for 30, 60, or 180 minutes. All meals were stored at -25° C. until needed.

The herring meals were fed to 20-day-old male New Hampshire chicks as the principal protein supplement in rations containing 17 to 21% protein. Chicks showed a considerably less rapid growth rate on rations containing the commercial meals than on rations containing the low-temperature meals. Supplementation of rations containing the commercial meals with a mixture of the B complex vitamins raised the nutritive values of these meals to that of the low-temperature meals. A folic acid deficiency was largely responsible for the inferior nutritive value of the commercial meals. Thiamine, biotin or inositol deficiencies also may have been contributing factors to the inferior nutritive value of the commercial meals.

(over)

 ABSTRACTER: Martin Heerdt

6.139 THE NUTRITIVE VALUE OF HERRING MEALS. 2. EFFECT OF HEAT ON AVAILABILITY OF ESSENTIAL AMINO ACIDS

Bissett, H. M. and Tarr, H. L. A.
Poultry Science 33, No. 2, 250-254 (March 1954)

Samples of whole herring and of herring presscake were obtained from 50-pound lots of the respective herring materials after they had been blended in a silent cutter. Identification of these materials and the method used in preparing meals from them appear in Table 1 (this card, over). Not all of these meals were prepared from identical raw material. The herring materials were chemically hydrolyzed by the method of Stokes et al (1945). Similar samples of herring materials were enzymically hydrolyzed by the method of Clandinin (1949). Growth of Lactobacillus casei on the medium of Dunn et al (1949) was used to determine arginine. The method of Henderson and Snell (1948) which employs Streptococcus fecalis R. was used to determine methionine. The methods of Stokes et al (1945) and of Gunness et al (1946) were used to determine the other nine amino acids.

The results in Table 1 are based on the nitrogen content of the herring materials. These results show no important difference in the total arginine, lysine, and methionine content of the various meals, the whole raw fish, or the presscakes. However, availability as indicated by enzyme digestion was definitely higher in the raw fish and the presscake. Only in herring meals No. 10 and 14 that had been heated for 180 minutes at 159° C. did enzyme hydrolysis indicate a considerable decrease in the availability of the essential amino acids. Previous work (Tarr et al 1954) showed that the biological value of meal No. 14, as determined by chick growth studies, was much lower than that of meal No. 10. In the present study, meal No. 14 contained only one-sixth of the available tryptophane and about one-half of the available lysine, methionine, threonine and valine that was contained in meal No. 10.

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 ABSTRACTER: Martin Heerdt

AUTOXIDATION OF UNSATURATED FATTY ACIDS

EFFECT OF HEAT ON HERRING MEAL QUALITY

DECOMPOSITION OF FRYING FATS

EFFECT OF HEAT ON MEAL QUALITY

6.139

The nutritive value of the low-temperature meals was not lowered by heating for 30 to 60 minutes at 149° C. In 13 out of 17 cases in which comparisons were available, chicks showed better growth on the heated meals than on the unheated meals. It is possible that the reason for this improvement in growth was similar to that noted with moderately heated soybean meal. This effect apparently was not associated with the trypsin inhibitor. The nutritive value of herring meals heated for 180 minutes was seriously impaired, and this impairment could be overcome only to a slight degree by the addition of lysine. The nutritive value of a low-temperature meal produced in February was more seriously impaired by heating for 180 minutes than was the nutritive value of a corresponding meal produced in November. No other seasonal differences were observed.

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The amino acids that were inactivated were those most readily involved in Maillard-type reactions. Free pentose sugar (ribose) is the single most important factor in permitting Maillard-type browning in heated fish muscle (Tarr, 1953). Since the February 1951 herring meals contained a large quantity of mature milts, deoxypentose, or pentose, might be responsible for this inactivation of amino acids. Determinations showed that both the total pentose, which probably included a small amount of the deoxypentose, and the deoxypentosenucleic acid were considerably higher in the meals produced in February than those produced in November or late December.

There was no difference in the availability of arginine, lysine, and methionine, in 5 dissimilar meals prepared from the same lot of December 1951 herring (table 3, omitted). These meals were as follows: (1) an air-dried meal; (2) an unextracted flame-dried commercial meal; (3) a hexane-extracted, flame-dried commercial meal; (4) an overheated flame-dried meal; and (5) an overheated flame-dried meal in which further heating occurred after sacking.

TABLE 1.—*The effect of heat on the availability of the essential amino acids in November 1950 and February 1951 herring meals (gms. of amino acid per 16 gms. of nitrogen)*

	Arginine		Histidine		Isoleucine		Leucine		Lysine		Methionine		Threonine		Valine		Tyrosine		Trypto-phane		Phenyl-alanine	
	Acid	En-zyme	Acid	En-zyme	Acid	En-zyem	Acid	En-zyme	Acid	En-zyme	Acid	En-zyme	Acid	En-zyme	Acid	En-zyme	Alkali	En-zyme	Alkali	En-zyme	Acid	En-zyme
November 1950 materials																						
Whole herring (2.69% nitrogen)	6.7	6.5							11.8	9.1	3.5	3.8										
Herring press cake (5.28% nitrogen	7.0	6.1							12.9	12.0	3.6	4.2										
Low temperature dried meal No. 7 (11.5% nitrogen)	6.3	4.3	2.8	1.8	4.9	4.1	7.6	8.0	11.8	7.7	3.1	2.6	4.1	2.4	5.3	3.5	2.8	3.1	1.5	2.0	3.7	3.3
Low temperature dried meal heated 30 min. at 159°C. (No. 8) (11.9% nitrogen)	6.4	4.9	2.6	1.9	4.3	3.5	7.4	6.6	10.8	7.9	3.0	2.5	3.9	2.3	5.4	3.8	2.6	3.1	0.65	1.9	3.8	3.4
Low temperature dried meal heated 60 min. at 159°C. (No. 9) (12.0% nitrogen)	6.2	4.8	2.5	1.7	5.6	3.5	7.7	5.8	11.2	8.1	3.4	2.8	3.8	2.1	5.2	3.6	2.6	3.0	0.75	2.1	3.6	3.2
Low temperature dried meal heated 180 min. at 159°C. (No. 10) (12.5% nitrogen)	6.5	2.3	2.2	0.2	4.4	.9	7.0	0.8	10.5	1.1	2.6	0.9	3.4	0.26	5.5	0.4	2.6	0.4	0.6	0.18	3.9	0.35
Normal commercial flame dried meal (No. 1) (11.5% nitrogen)	6.1	5.5	2.2	0.8	4.6	3.9	8.9	7.8	10.4	9.5	2.2	2.8	3.9	2.5	5.6	4.2	2.6	2.8	0.7	1.7	3.6	3.3
February 1951 materials																						
Low temperature dried (No. 12) (11.4% nitrogen)	6.6	4.2	2.2	0.9	4.9	4.5	7.0	6.0	12.6	10.0	2.8	1.8	3.5	4.2	5.0	4.1	2.4	3.4	0.60	1.7	4.3	3.3
Low temperature dried meal heated 60' at 159°C. (No. 13) (12.1% nitrogen)	7.1	7.0	2.2	1.1	4.9	3.8	7.7	5.2	11.9	9.2	2.6	1.9	3.9	3.6	5.3	3.3	3.0	2.5	0.63	1.5	3.8	2.7
Low temperature dried meal heated 180' at 159°C. (No. 14) (12.2% nitrogen)	7.1	2.2	2.1	0.2	4.6	0.8	6.9	0.7	9.1	0.5	2.1	0.5	3.6	0.13	5.1	0.25	3.0	0.3	0.6	0.03	3.6	0.35
Normal commercial meal (No. 4) (11.7% nitrogen)	6.6	5.0	2.1	1.0	4.6	4.4	5.9	5.6	12.2	12.0	2.4	2.3	3.3	4.8	4.8	3.7	3.3	3.6	0.62	1.6	3.6	3.6

4.5

Hilditch and co-workers proposed that the isolated double bond might be oxidized by primary addition of oxygen to the double bond followed by a rearrangement to an unsaturated hydroperoxide. On this view, autoxidation of oleic acid or esters would lead only to a mixture of 9- and 10-hydroperoxides but not a mixture of 8- and 11-hydroperoxides as postulated by Farmer.

Farmer, too, has later discussed the possibility that the chain-initiating radicals might be formed by the addition of oxygen to a double bond and that these radicals could then start the chain reaction involving the α-methylenic hydrogen atom.

Further, it was shown that the autoxidation of the unsaturated fatty acids containing methylene-interrupted double bonds is accompanied by a shift of double bonds which results in hydroperoxides with conjugated bonds by a free radical mechanism. The conjugation of the double bonds can only take place when the double bonds are separated by one methylene group. In this case, according to Bolland and Koch and Bergstrom, rearrangement is incomplete yielding only approximately 70% conjugation.

In the last years we have gained a better knowledge of the initial steps in the autoxidation of the unsaturated fatty acids. However, very little is yet known about the decomposition products of the peroxides.

4.4 (Cross Reference: 2.8)

atmosphere during the entire heating interval. Four-ounce quantities of potato chips were fried in the fats twice daily. Fat turnover was negligible. Samples were taken periodically for a period of 9 days and were subjected to chemical analysis.

Results of odor judgments on potato chips incubated at 145° F. in glass jars indicate that the keeping quality of fried foods might be greatly increased if the frying fat could be protected from atmospheric oxygen.

"Changes resulting in foam development, changes in physical properties of the fried food, loss of rancidity resistance in both fat and fried food, color development and objectionable flavor development are associated with thermally induced oxidative changes rather than hydrolysis. These thermally induced changes may be restricted to practical limits if the following conditions are maintained:

1. Rapid rate of fat turnover.
2. No prolonged heating of fat without compensating turnover.
3. Non-aeration of hot fat during circulation through heat exchangers, filters, the frying equipment, or by the 'cascading' of hot fat into holding tanks.
4. Avoidance of intense heat input in the attempt to secure additional frying capacity.
5. Removal of improperly designed heating elements which result in intensely heated focal points.
6. No contamination of fat through drip back from exhaust vents.
7. No contamination of fresh fat through 'feed back' of old or spent fat.
8. Control of chemical contamination from products fried in the fat.
9. Control of deposited food fragments during frying.
10. No contamination with cleaning and filtering compounds."

3.231 NEW REFRIGERATING PRINCIPLE?

Anonymous
World Refrigeration and Air Conditioning 5, No. 7, 382 (July 1954)

Recent research points the way to what may prove an important refrigerating technique of the future. Jean Peltier discovered in 1834 that if electricity was passed through the junction of two different metals, heat was produced when the electricity flowed one way and cooling when flowing the other. No practical use could be made of the discovery at that time, but investigators in the G. E. C. Research Laboratories at Wembley have discovered that they could get a heating or cooling effect very much greater than that produced by Peltier, and a combination of semiconductors has been discovered that will give a cooling effect of as much as 50° F.

At a recent Royal Society Conversazione held in London, a small unit was demonstrated using bismuth and a compound of bismuth and tellurium as the semiconductors and miniature ice cubes were very soon frozen in a small metal tray. It is too early yet to say whether this is the forerunner of a new type of refrigerator but it has obvious potentialities.

Meanwhile, in the United States the reverse of this principle is being applied as a room heating project. Workers at the Rensselaer Polytechnic have patented a method of creating a current by heating two dissimilar metals.

Enough power has resulted to drive four small fans. The source of power is a thermocouple, linking two unlike metals. Two pins, each half stainless steel and half copper are connected with wires. Each runs through a half-inch ceramic insulating wall, the steel end inserted in a furnace burning kerosene or jet oil, the copper end exposed to the cold air.

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Reprinted in whole

2.00 ENZYMATIC DARKENING OF SHRIMP

Faulkner, Marian B.; Watts, Betty M.; and Humm, Harold J.
Food Research 19, No. 3, 302-310 (May-June 1954)

"Black spot" is a condition in which fresh shrimp develop a black discoloration starting in the head and spreading to the tail where it forms black bands outlining the body segments. Although retarded by proper icing, the blackening of the whole shrimp may be well advanced before the shrimp can be marketed, if the trip lasts from several days up to two weeks. With the expansion of the shrimp fishery and the consequent longer trips, the need for understanding and control of the "black spot" problem becomes more urgent.

It has been experimentally established that the color change is primarily enzymatic in nature and is not due to bacterial action.

The enzymatic darkening of fresh shrimp can be inhibited by (a) limiting the oxygen supply by holding the shrimp in refrigerated solutions rather than on ice or in dry refrigeration, (b) lowering the pH, and (c) dipping in bisulfite solutions, especially at lowered pH values. Unfortunately, the practical application of any of these methods for the preservation of fresh shrimp offers difficulties.

When shrimp are stored in tanks of refrigerated circulating sea water, blackening is not of primary importance as a cause of spoilage; instead, off-odors, possibly of bacterial origin, become the limiting factor. Lowering the pH of the storage water gives greater protection against blackening and retards the production of off-odors of a putrefactive nature, but continued immersion in acidified waters causes the early softening of texture in the shrimp. The cause of this texture change has not been followed.

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 ABSTRACTER: Kathryn L. Osterhaug

3.12 EXPERIMENTAL PRESERVATION OF FISH AND BEEF WITH ANTIBIOTICS

Tarr, H. L. A.; Boyd, John W.; and Bissett, H. M.
Journal of Agricultural and Food Chemistry 2, No. 7, 372-375 (March 31, 1954)

The authors studied (1) practical methods of using chlorotetracycline (aureomycin hydrochloride) for retarding bacteriological spoilage in fish, (2) the stability of chlorotetracycline in fish, and (3) the antibiotic effect of chlorotetracycline, thiolutin and puromycin in ground beef and fish.

Part 1 of this study was concerned with various kinds of fish that had been placed in solutions and/or ices containing chlorotetracycline or chlorotetracycline plus potassium di-hydrogen phosphate. A flake ice machine was used to convert the various solutions into flake ice. Insulated, galvanized tanks 30 x 17 x 17 inches and equipped with drains were used for holding the fish. A 1-inch-thick center steak from each fish was used as the source of a 200-g. sample that was blended with 600 ml. of water and used for making direct bacterial counts after staining with aniline-methylene blue.

Headed and dressed lingcod (Ophiodon elongatus) in rigor mortis that were held in ice containing, respectively, 0, 1, 2, and 4 p. p. m. of chlorotetracycline for 11 and 15 days produced steaks that showed, respectively, 128, 24, 9, and 12; and 187, 20, 37, and 15 million bacteria per gram. Similar lingcod held in ice containing, respectively, 0, 1, 2 plus 200 p. p. m. of potassium acid phosphate, and 2 p. p. m. of chlorotetracycline for 9 and 14 days produced steaks that showed, respectively, 62, 12, 9, and 18; and 420, 65, 75, and 68 million bacteria per gram.

Troll-caught, dressed, small spring salmon (Oncorhynchus tshawytscha) in rigor mortis were held aboard a fishing vessel for 6 days in ice (lot 1) or in about 1/3 their weight of clean -1° C. sea water containing 2 p. p. m. of chlorotetracycline (lot 2) before being landed and held in ice on shore.

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 ABSTRACTER: Martin Heerdt

2.02 RIGOR MORTIS IN BEEF

Marsh, B. B.
Journal of the Science of Food and Agriculture 5, No. 2, 70-75 (February 1954)

The author studied (1) the onset of rigor mortis in the longissimus dorsi muscle of the ox and (2) pH and adenosine triphosphate (ATP) content changes accompanying rigor. In essence, the onset of rigor mortis in beef muscle closely resembles the onset of rigor mortis in rabbit muscle. The coincidence in time between shortening (coupled with decreasing extensibility) and ATP decomposition provides additional evidence that the onset of rigor is intimately related to the dephosphorylation of ATP. The correlation reported by March (1953) supports the view that shortening in rigor may be regarded as a slow and irreversible physiological contraction.

Appreciable differences exist between rigor in beef muscle and rigor in rabbit muscle, the most important being the effect of temperature on the rate of acid production. At physiological temperature, pH/time curves for rabbit and beef are almost identical. This is an indication of very similar rates of ATP turnover at 37° C. in surviving muscle of the two species. In both species the temperature coefficient of acid production increased with a rise in temperature. This coefficient, however, is considerably greater in beef than in rabbit. The effect of a 10° C. decrease from physiological temperature was as great in beef as a 20° C. decrease in rabbit muscle. At 37° C. the temperature coefficient of acid production in beef had a value (very high) of about 4.5.

In beef the onset of rigor mortis coincides with the rapid phase of ATP decomposition (Table 2, omitted) and this ATP decomposition is directly related to pH when the ultimate pH is low (Table 3, omitted). Therefore, the onset of rigor may be followed (approximately) by pH determinations alone. From the time-course of acid production (Fig. 2, omitted) the progress of rigor in a muscle of low

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 ABSTRACTER: Martin Heerdt

3.12

After being held in ice on shore for 6, 9, and 14 days, respectively, lot 1 contained 25, 62, and 212 million bacteria per gram; whereas lot 2 contained 0, 0.1, 12.0. Similar troll-caught spring salmon were held aboard a fishing vessel for 5 days in ice (lot 3) or in about 1/3 their weight of clean -1° C. sea water (lot 4) before being landed and held in ice on shore. After being held in ice on shore for 7 and 9 days, respectively, lot 3 contained 125 and 171 million bacteria per gram; whereas lot 4 contained 14 and 31.

Four lots consisting of 2 each of troll-caught coho salmon (Oncorhynchus kisutch) that had been dressed with gills removed and dipped for one minute in sea water containing, respectively, 0, 5, 5 plus 200 p.p.m. of potassium acid phosphate, or 10 p.p.m. of chlorotetracycline and then held in ice for 13 and 18 days contained, respectively, 8, 0.8, 0.5, and 1.0 million bacteria per gram and 180, 120, 75, and 90.

Headed and dressed lingcod (Ophiodon elongatus) pre-rigor mortis were immersed for one minute in different sodium chloride solutions, then held in ordinary ice for varying lengths of time, and finally cut to obtain a 3-inch thick steak that was incubated one day in air at 10° C. in a covered glass container, after which direct bacterial counts were made. It was found that lingcod immersed in 3% sodium chloride solutions containing, respectively, 0, 50, and 100 p.p.m. of chlorotetracycline and then held for 3, 6, and 10 days in ordinary ice produced steaks that showed, respectively, 1, 0, and 0; 130, 1, 1; and 280, 6, and 1 million bacteria per gram.

Chlorotetracycline was found to be fairly stable when incorporated in minced brill, minced red spring salmon, or minced beef stored for 2 days at 4° C. but was readily inactivated if heated. One p.p.m. of chlorotetracycline incorporated in ground beef or fish suppressed bacterial development but permitted yeast growth as did thiolutin (10 p.p.m.) in the presence of chlorotetracycline. Puromycin was devoid of antibacterial activity. Organoleptic examinations throughout the investigations showed that fish held in ordinary ice were obviously stale about 4 or 5 days earlier than fish stored in chlorotetracycline-containing ices.

2.02

ultimate pH may be predicted (at a given temperature) from a single pH determination. Knowing the rate of cooling of the longissimus dorsi muscle in a side of beef located in an efficient chill room makes it possible, with the aid of Table 4 (omitted), to predict the progress of rigor under practical conditions. Assuming a 2-hour post-mortem pH of 7.10 and an ultimate pH of 5.30, all glycolytic changes should be complete in deep (75 mm.) muscle and in surface muscle (3 mm.), respectively, in about 26 and 30 hours. Completion of the onset of rigor, however, varies according to (1) chill room efficiency, (2) initial pH, and (3) ultimate pH. An initial pH higher than 7.10 or an ultimate pH lower than 5.30 is not likely, and the rate of cooling can not greatly exceed 26 to 30 hours. With more efficient cooling, a period of 36 hours post-mortem should allow all glycolytic changes to reach completion. By allowing this interval between killing and the beginning of freezing, abnormal behavior problems associated with thaw-rigor due to freezing before the completion of the onset of rigor (such as have already become apparent in the freezing of whale meat) should be preventable in beef.

3.231 (Cross Reference: 0.8)

The difference in temperature generates the current which flows from the hot to the cold end of the pin. This is then fed to a line leading to the fan motors. In the pilot plant there are 2,400 thermocouples to produce power enough to drive the four fans. These fans suck in cold air from the outside, which is warmed by the exhaust from the furnace, and disseminated through the room.

2.00 (Cross Reference: 1.85)

The use of slightly acidified bisulfite dips preliminary to either ice or refrigerated storage seems to offer possibilities for convenience, economy of manipulation and prolonged protection. However, the desirability of the use of sulfur dioxide needs careful evaluation from a nutritive standpoint. It is known to destroy thiamine and, although it can prevent the nonenzymic browning due to condensation of amino acids and sugars, it does not prevent the early stages of this reaction which result in loss of biological availability of the amino acids. At present, sulfur dioxide and bilsulfites are used for the preservation of certain fruits and vegetables, usually preparatory to dehydration. These foods are not important sources of protein or thiamine, but rather of ascorbic acid and carotene, which are protected by sulfur dioxide. Extension of the use of sulfur dioxide to animal protein foods such as shrimp should probably not be recommended until much more information is available on the extent of its penetration into shrimp and the extent and nature of nutritive losses brought about by its use.

6.3 THE OCCURRENCE OF D-XYLOSE AND D-GALACTOSE IN BROWN SEAWEEDS

Dewar, E. T.
Chemistry and Industry, No. 27, 785-786 (July 3, 1954)

Although galactose and xylose are major components of the polysaccharides of red seaweeds (Rhodophyceae), their presence in brown seaweeds (Phaeophyceae) is not so common. Percival and Ross detected by chromatographic analysis the presence of both galactose and xylose in the hydrolysis products of fucoidin, a highly purified sample of which from Himanthalia lorea gave galactose, 4.1 and xylose, 1.5%. Galactose has also been detected in the seed mucilage of Ascophyllum nodosum. The occurrence of these two sugars in Fucus vesiculosus, after hydrolysis, has now been confirmed by the isolation of crystalline derivatives.

The dried milled seaweed (14.95 g.) was refluxed three times for 2 hours with 85% (v/v) methanol (150 ml. each time) to remove mannitol, and the weed residue was then hydrolysed with N-sulphuric acid (150 ml.) at 100° for 4 hours. After separation of the insoluble residue, the hydrolysate was deionized with resins, decolorized, and concentrated to a glass (19.12% of the seaweed). Quantitative chromatographic analysis of this material, using n-butanol:ethanol:water -- 40:11:19 v/v, gave fucose, 9.2; xylose, 1.1; and galactose, 0.4% (calc. as the free sugars as percentage of anhydrous seaweed). There were also smaller quantities of mannose, glucose (this seaweed sample contained only a trace of laminarin), and two unknowns with R_F values less than galactose (probably the products of incomplete hydrolysis). Mannose has previously been identified in Fucus vesiculosus by Manske.

Separation of the glass (2.635 g.) on a cellulose column, using n-butanol saturated with water as mobile phase, gave three fractions. The first (1.026 g.; $[\alpha]_D^{20}$ -- 64.8° in water) was chiefly L-

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6.231 ULTRASONICS -- A REVOLUTION IN HOMOGENIZING, EMULSIFYING, AND BLENDING

Rose, F.
Canadian Fisherman 41, No. 8, 19, 22 (August 1954)

A method of producing effective ultrasonic waves by purely mechanical means has recently been perfected. This method is said to be the simplest and the most economical one so far developed to generate low frequency ultrasonics for emulsification, homogenization, and blending.

Particle sizes as small as one micron can be produced, and emulsions made by this process are therefore more stable than those produced by conventional means. Besides the much lower power requirement of ultrasonic equipment and the high output rate, the ultrasonic principle completely avoids the heat that is normally generated by conventional homogenizers of the colloid mill or piston type.

Sound waves in this generator are produced mechanically by a blade that vibrates at its own frequency in the liquid stream of the medium passing over it after emerging out of a high velocity jet nozzle. At ultrasonic frequencies (approximately 22 kilocycles per second in liquid) the particles of the liquid medium are subjected to a fast rythm of alternating compression causing pressure spots, a phenomenon known as cavitation. Collapsing of the cavities causes minor local explosions and violent molecular acceleration in the medium as it rushes over the blade, with only this flow keeping the blade in continuous ultrasonic vibration. Pressures of an intensity up to 30,000 pounds per square inch are released locally, completing the process of breaking down the particle size.

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 ABSTRACTER: Roy C. Stevens

9.14 HOW MAY FISH HATCHERY FOODS NEEDS BE MET

Sinnhuber, Russell O.
Fish Commission of Oregon Research Briefs 4, No. 1 (December 1952)

Suitable diets for raising salmon are hard to find because they must contain protein, fats, carbohydrates, ash, and fiber in proper balance. The diet must also contain sufficient amounts of the various vitamins and other nutritional factors. The quantity of food given and the size of the food particles must be adjusted to the size of the fish and the temperature of the water.

At the present time the Fish Commission of Oregon in cooperation with the Seafoods Laboratory is engaged in formulating a suitable diet for salmon. The constituents found in natural foods consumed by salmon are being used as a basis for a diet composed of readily available, inexpensive food materials. Approximately 10-million pounds of food was used for feeding hatchery fish in Oregon and Washington in 1947. When the proposed dam programs go into effect, about 25-million pounds of food will be required annually to supply the existing and proposed hatcheries. Hatchery demands are in competition with those of fish reduction plants, fox and mink feeders, pet food manufacturers, and fish bait manufacturers. A substitute for beef liver is urgently needed for feeding hatchery fish and mink because condemned beef livers are becoming difficult to obtain. However, the author believes that eventually a suitable equivalent will be found so that the small amount of beef liver still necessary may be elimated entirely.

It is doubtful if any single food will ever meet all the requirements of a good hatchery diet. Hatchery fish diets in all probability will need to be supplemented with vitamins and growth factors not presently found in readily obtainable low cost material. The foods presently available at low cost for use in formulating diets for hatchery fish are as follows:

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 ABSTRACTER: Martin Heerdt

9.7 FISHERMAN'S TRAINING SCHOOL IN NOVA SCOTIA

Cooke, Roy K.
Canadian Fisherman 41, No. 8, 27-28 (August 1954)

The Department of Trade and Commerce of the Provincial Government of Nova Scotia has recently begun operation of a special navigation school for fishermen at Lunenberg, Nova Scotia.

Included in the curriculum are chart work; rules of the road; signalling, both semaphore and morse codes; compass reading; the use of the sextant; and general seamanship. Instruction is also given in the use of modern navigational equipment such as radar, loran, and echo sounders. Rope and wire splicing and net mending are important additions to the courses offered by the school.

The school is unique in Canada and is said to be filling a great need to keep fishing abreast of other Canadian industries. Several mobile schools are also being operated by the Department in other sections of Nova Scotia. There is no age limit nor any special length of time that a pupil must attend. Many fishermen take advantage of the time their vessel spends in the harbor for repairs etc. to attend classes.

 ABSTRACTER: Roy C. Stevens

9.14 (Cross Reference: 6.51)

Scrap Fish:

Common Name	Scientific Name
Arrow-toothed sole	Atheresthes stomias
Rex sole	Glyptocephalus zachirus
Bellingham sole	Isopsetta isolepis
Skates	Raja sp.
Hake (Pacific)	Merluccius productus
Shad	Alosa sapidissima
Carp	Cyprinus carpio
Chubs	Mylocheilus caurinus and others
Squawfish	Ptychocheilus oregonensis
Jack mackerel	Trachurus symmetricus
Sharks	Squalus suckleyi and others
Sand dabs	Citharichthys sp.

Fish wastes

Salmon and tuna viscera, liver, and trim
Fish stickwater and condensed fish solubles
Other fish and fillet scrap

Fiber

Wood cellulose
Fruit pomaces
Vegetable wastes

Fat

Present in many fishery waste products, and the diet may be supplemented by cheaper marine oils.

Other sources of protein

Fish meal
Crab meal
Horsemeat
Beef blood
Dried liver meal
Poultry by-products

Carbohydrate material containing protein

Alfalfa meal
Soybean meal
Corn meal
Wheat shorts
Peanut meal
Linseed meals
Wheat germ meal

Minerals

Considerable amounts are present in fishery wastes and the diet may be supplemented by readily available materials.

Vitamin and food factor supplements

Yeast
Beef livers, as well as those from horse, hog, and sheep
Fish livers and viscera
Condensed fish solubles
Synthetic materials for supplementation

6.3

fucose. The second (0.524 g.) was a fucose-xylose mixture, in which D-xylose was identified as its di-O-benzylidene dimethyl acetal (0.146 g.); m.p. 205 - 7° (after recrystallization from chloroform-ligroin), not depressed on admixture with an authentic specimen; $[\alpha]_D^{19}$ - 7° in $CHCl_3$ (c, 1.5). The third fraction (0.102 g.) was a galactose-glucose mixture, from which galactose was isolated as its crystalline methyl-phenylhydrazone (0.022 g.); m.p. 185 - 6° (after recrystallization from ethanol), unchanged on admixture with D-galactose methylphenyl-hydrazone; there was insufficient material for a rotation. D-Galactose methylphenylhydrazone has been found to possess $[\alpha]_D^{20}$ - 2.7° in pyridine (c, 0.93; 4-dm. tube); McIlroy reports that this derivative is dextro-rotatory in a pyridine-alcohol mixture and slightly laevo-rotatory in glacial acetic acid.

The manner in which these sugars are combined in brown seaweeds is still unknown.

6.231

The production unit (see figure 1) is made up of a low-horsepower motor (as small as 2 horsepower for up to 420 gallons per hour), a gear pump driven by the motor, suction and delivery pipes made of stainless steel, or flexible noncontaminating rubber, and, at the end of the delivery pipe, the cylindrical shaped ultrasonic head which contains the vibrating element (see figure 2).

A smaller laboratory model has also been developed for use in research or for small production batches such as high value pharmaceutical or cosmetic preparations. In the manufacture of medicinal preparations such as cod liver oil emulsions the ultrasonic method is said to be much faster and much less costly from all aspects in obtaining the optimum in consistency and stability of the end product.

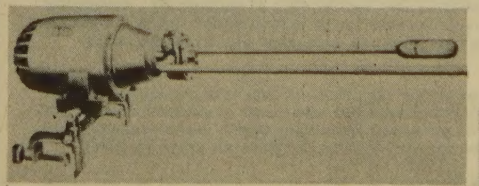

Fig. 1. Complete view of typical ultrasonic homogenizer and emulsifier, showing swivel arrangement of suction and delivery pipes, and fixing clamp for portable use. This small unit handles as much as 420 gallons per hour.

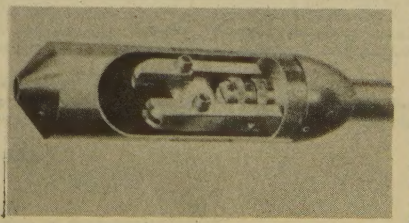

Fig. 2. Sectional view of operating head of ultrasonic homogenizer and emulsifier, showing vibrating blade and high velocity jet nozzle, adjustable inside removable resonant bell.

7.89 APPLICATIONS OF ULTRAVIOLET LIGHT TO FISHERIES TECHNOLOGY

Sinnhuber, R. O. and Law, D. K.
Fish Commission of Oregon Research Briefs 2, No. 1 (August 1949)

Parasitic infection is common at certain times of the year in some species of fish. According to the authors, none of the parasites present in ocean fish in this part of the United States have ever been known to infect man. However, the detection and removal of parasites from fish fillets is necessary for the maintenance of quality. Candling has been used to some extent as an aid in finding and removing parasites from fillets prior to marketing. In candling, the fillets are usually passed across a glass plate having an intense incandescent light beneath it. The parasites, which are usually nematodes, then become visible and can be removed by the inspector. This method has a number of disadvantages, because the operator must continually look at an intense light and parasites in the thicker fillets are not always visible.

For comparison, the authors tried ultraviolet light in a dark room in place of incandescent light for finding parasites in fillets. In one lot consisting of 10 pounds of frozen fillets (26 individual fillets), 8 nematode-like parasites were found by examination over a 300-watt incandescent bulb, whereas in the same lot of fillets 81 parasites were found by subsequent examination under ultraviolet light. In a second 10-pound sample of fillets (30 individual pieces) from a different kind of fish, 5 parasites were found with incandescent light, whereas 57 parasites were found with ultraviolet light.

The ultraviolet lamp the authors used was a Glo-Craft Model 106 portable 100-watt flood type bulb mounted so as to prevent the light from entering the eyes of the operator. When a number of samples were to be examined, the operator wore dark glasses that provided complete coverage of his eyes. The fillets were examined on both sides against a black background. With thin fillets,

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 ABSTRACTER: Martin Heerdt

7.80 ERRORS OF THE SECOND KIND IN ORGANOLEPTIC DIFFERENCE TESTING

Baker, G. A.; Amerine, M. A.; and Roessler, E. B.
Food Research 19, No. 2, 206-210 (March-April 1954)

A simple organoleptic experiment on the detection of sucrose in distilled water by means of paired tests has been presented. At the present level of experimentation it appears that the probability of making the right choice out of a pair increases linearly with respect to the logarithm of the concentration but that these linear relationships varied greatly for different tasters with somewhat similar training and background. Certain possible groupings are indicated. Also, these data indicate that the number of tasters detecting a given concentration may be linear on a log-concentration scale.

From the standpoint of detecting organoleptic differences if they exist it is important to use the best taster avaiable. The probabilities of errors of the second kind vary greatly from taster-to-taster and from group-to-group. A combination of tasters gives results that are much poorer than the best but somewhat better than the worst.

Present experimental methods control errors of the first kind satisfactorily, but without proper attention to errors of the second kind progress will be slow and its cost will greatly exceed what is necessary to achieve the desired results.

 Author's summary

7.6139 A RAPID CHROMATOGRAPHIC METHOD FOR THE DETERMINATION OF VITAMIN A IN WHALE-LIVER OILS

Green, J. and Singleton, D. O.
Analyst 79, No. 940, 431-434 (July 1954)

Vitamin A in whale-liver oils is accompanied by substances that absorb light appreciably in the ultraviolet region and make an accurate direct spectrophotometric determination impossible. The chief interfering substance is kitol, which is present as an ester. Other substances, such as anhydrovitamin A, may also be present.

Although chromatographic methods for the determination of vitamin A in whale-liver oils have already been developed, these methods are lengthy and involved. There is thus a need for a rapid and simple method.

It was found that, by the use of floridin earth that has been neutralized with ammonia, vitamin A can be quantitatively absorbed and eluted and, by this means, separated from the interfering substances in whale-liver oils. If the whale-liver oil being analyzed contains appreciable amounts of anhydrovitamin A, the oil must be saponified.

The reproducibility of the method was determined by a series of six analyses on one whale-liver oil after saponification. The results were as follows:

Range of potencies found	39,800 to 42,900 i.u. per g.
Mean value	41,300 i.u. per g.
Standard error of mean	500 i.u. per g.

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 ABSTRACTER: F. Bruce Sanford

7.879 THE USE OF THE 2-THIOBARBITURIC ACID REAGENT TO MEASURE RANCIDITY IN FROZEN PORK

Turner, E. W.; Paynter, W. D.; Montie, E. J.; Bessert, M. W.; Struck, G. M.; and Olson, F. C.
Food Technology 8, No. 7, 326-330 (July 1954)

The authors used 2-thiobarbituric acid (TBA) to measure oxidative rancidity in frozen pork. Samples of pork for analysis were reground twice through a 1/8-inch plate, mixed thoroughly after each grinding and held at 32° F. until ready to use. Five grams of the ground pork sample, 5 ml. of 20% trichloracetic acid in 2 M phosphoric acid, and 10 ml. of 0.01 M 2-thiobarbituric acid were then placed in a 50 ml. centrifuge tube. This tube was held in a bath of boiling water for 30 minutes (its contents were stirred occasionally while being heated), then removed and chilled in a bath of ice water for 10 minutes. The solid layer of fat which formed was removed with a spatula and the aqueous layer containing the pink-colored TBA complex was left behind. Fifteen ml. of solvent containing a 2:1 mixture of iso-amyl alcohol-pyridine was added to this aqueous layer. The tubes were shaken vigorously for 2 minutes and then centrifuged for 15 minutes at 2400 r.p.m. to break the emulsion formed during extraction. The resulting clear solvent was decanted into a cuvet and the color of the solvent was measured at 538 mμ against a solvent blank. The TBA value is defined as absorbency at 538 mμ using a Beckman DU spectrophotometer and standard size one cm. corex cuvets.

Pork reacts with the TBA reagent to give a bright pink color. The solvent extract exhibits an absorption maximum at 535-538 mμ which is approximately the same as is obtained with oxidized milk fat or malonic dialdehyde. This color is presumably caused by the oxidation of unsaturated fatty acids. The amount of color obtained with fresh pork when heated with TBA increases with the length of time of heating. A 30-minute heating period allows the analyst time to prepare another set of tubes and gives good differentiation between fresh and rancid samples. Uniform extraction of the TBA

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 ABSTRACTER: Martin Heerdt

ULTRAVIOLET LIGHT IN FILLET INSPECTION

ORGANOLEPTIC DIFFERENCE TESTING

CHROMATOGRAPHIC DETERMINATION OF VITAMIN A

RANCIDITY MEASUREMENT

7.879 (Cross Reference: 4.5)

complex is obtained by 2 minutes of vigorous shaking with iso-amyl alcohol-pyridine solution. The degree of comminution and the uniformity of meat particle size also are critical. However reproducible results were obtained by grinding the samples twice through a 1/8-inch plate. Small amounts of naturally occurring carbohydrates in fresh beef or pork do not interfere with the TBA test. However, the sugars present in cured meats may require a correction for their presence.

The TBA test was found to be a much more sensitive measure of incipient rancidity than chemical tests for fat peroxides. In a comparison between TBA values and peroxide numbers obtained from several samples of frozen pork ranging from 4 to 17 months in age, the TBA values increased consistently with the age of the samples, whereas the peroxide numbers showed considerable variation.

Samples of ground pork which had been prepared, packaged, and held in storage were analyzed by the TBA test and tasted as broiled pork patties after 1, 6, 10, and 14 days of storage at 5° F. The pork samples with a TBA value above 0.46 were judged borderline by the taste test panel; those with a TBA value over 1.2 were judged unacceptable. Pork having a TBA value below 0.30 was judged acceptable for use in wieners, whereas pork with a TBA value of 0.5 or over was judged unacceptable.

7.89

however, the parasites were completely visible without examining both sides. Nematode-like parasites in frozen fish as well as fresh fish give off a bluish-white fluorescence under ultraviolet light. Bones and fish scales that have not been removed in the filleting operation are also plainly visible under ultraviolet light and may be removed at this time.

Crab shell in either Pacific crab meat (Cancer magister) or in Atlantic crab meat (Callinectes sapidus) was found to give off a bluish-white fluorescence under ultraviolet light. Under ultraviolet light both fresh and canned Pacific crab meat and canned Atlantic crab meat were found to contain crab shell (the outer exoskeleton as well as the white inner endoskeleton) that had been overlooked in the picking and cleaning operation. The examination procedure and the light employed were the same as was used for the detection of parasites in fillets.

Ultraviolet light as a means of separating crab shell from crab meat could be used in place of the brine flotation method which is now employed. The advantages would be (1) elimination of a need for brine flotation equipment, (2) complete removal of shell without the loss of meat, (3) no necessity for control of brine concentration, and (4) no carry-over of brine solution into the meat. A search of the literature revealed a patent granted to E. C. Gibson in 1937 for a method of removing shell or chitin from crustacean flesh with the aid of ultraviolet light.

7.6139

In general, no other type of oil gave results as good as those found with the oils from whale-liver. The method, however, removes some of the interfering substances in the oils from other sources.

Vitamin A alcohol and vitamin A ester can easily be separated on floridin in the absence of interfering substances. With whale-liver oil, however, the proportion of alcohol and ester can only be determined if two assays are made, one on the whole oil and one on the saponified oil. Hence, if the amount of free alcohol is small, its determination is marked by losses that may occur during saponification.

6.14 SOME OBSERVATIONS ON EXTRACTION AND IODINE VALUES OF FAT FROM FISH TISSUE, PRESS CAKE AND MEAL, AND ON PEROXIDE VALUES OF MEAL FAT THE FIRST DAY

Olafsson, Pall(Icelandic State Herring Oil and Meal Factories, Siglufjordur, Iceland)
Timarit Verkfraeoingafelags Islands 38, No. 4 (1953)

Experience with fish meal made from whole herring, herring offal, rosefish, coalfish and white fish offal has shown that these meals heat as soon as they come from the dryer, a maximum temperature being reached in 10-20 hours from production. The course of heating varies with the type of meal, its fat content, and its moisture content. The following is typical of such heating:

Time from production, hrs.	Temperature in center of bag °C.	Time from production, hrs.	Temperature in center of bag °C.
0	29.5	0	24.5
5 1/2	36.5	5 1/2	32
9 3/4	39.5	9 1/3	34
14 1/4	40	13 3/4	36
17	39.5	17	35
21 1/4	38		
26 1/4	35.5	26 1/6	31
41 1/4	28		
51	22	50 5/6	19

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 ABSTRACTER: M. E. Stansby

6.14 SOME OBSERVATIONS ON EXTRACTION AND IODINE VALUES OF FAT FROM FISH TISSUE, PRESS CAKE AND MEAL, AND ON PEROXIDE VALUES OF MEAL FAT THE FIRST DAY (Continued from Card 1)

Solvent	Cold shaking method % fat in meal Time of shaking, hrs. 1/2	1	2	Extract. on hot plate % fat in meal
Acetone	5.0	5.2	5.4	12.5 (32 hrs.)
Benzene	6.5	6.5	6.7	
Chloroform	7.5	7.8	7.6	
Carbon tetrachloride	7.7	7.4	7.1	
Ethyl-ether	6.5	6.6	6.7	7.5 (20 hrs.)
Benzene-methanol azeotrop. mixt.	12.7	12.9	12.6	

The nitrogen content of the meal varied with the extraction method:

Method of extracting	Solvent	% N in extract
Cold shaking, 2 hrs.	Benzene-methanol mixt.	3.6
Hot plate, 20 hrs.	Benzene-methanol mixt.	4.0
Hot plate, 20 hrs.	Acetone	2.7
Hot plate, 20 hrs.	Ethyl-ether	0.85

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 ABSTRACTER: M. E. Stansby

6.73 AMBERGRIS FOUND IN A BRITISH COLUMBIA SPERM WHALE

Carter, Neal M. and Elsey, C. R.
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 99, 35-36 (June 1954)

A quantity of crude ambergris totaling about 360 pounds was recovered from the lower intestine of a 48-foot male sperm whale processed in the whaling plant at Coal Harbour, B. C. on Vancouver Island August 20, 1952. The largest lump when taken from the whale weighed 77 pounds. The other lumps and fragments ranged in weight from 4 pounds to less than an ounce. All of the lumps had a dark brown to black external color. On being broken or cut the lumps showed mottled shades and curved bands of gray, light brown, and almost black color. The lumps were plastic in consistency and floated heavily in water on being washed to remove adhering faecal matter. Some of the pieces were roughly spherical, others were quite irregular in shape. Most of the pieces had some fairly smooth rounded surfaces and some were bowl-shaped indicating that they were parts of outer concentric layers that had separated from an inner core.

After the material was dried in air at room temperature its color varied from brown to gun metal gray. The residual faecal odor gave way to a sweet, musty, musky, odor characteristic of ambergris and reminiscent of a good cigar. The loss in weight due to washing and air drying was 33%. The surface of the lumps when dry had become hard and brittle. Freshly cut surfaces, however, had a dull waxy appearance and left sticky crumbs when rubbed on a piece of paper. The lumps took a polish when stroked lightly with a cloth and displayed a mottling of brownish flecks. Some of the lumps showed numerous black horny beaks about 1/2 to 3/4 inch long that had come from the squid on which the whale had fed. Backbone vertebrae, a few smaller bones of fishes, some spicular skeletal fragments of marine invertebrates and diatoms, and some clear crystals about 1/8-inch long

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 ABSTRACTER: Martin Heerdt

6.192 BIOLOGICAL VALUE OF PROTEINS AS INFLUENCED BY DIETARY VITAMIN B_{12}

Baliga, B. R.; Balakrishnan, S.; and Rajagopalan, R.
Nature 174, No. 4418, 35-36 (July 3, 1954)

It has been shown by Frolich that chicks, fed underheated, low-quality soy bean oil meal, were depleted of their vitamin B_{12} reserves and consequently required the supply of dietary vitamin B_{12}, probably due to the antiproteolytic activity or soyin content of the underheated meal. Baliga and Rajagopalan have reported that vitamin B_{12} at 50 µgm. per kilo of the diet containing 10 percent raw soy bean protein (without any heat treatment) enhanced the biological value of the protein (the biological values for the raw and vitamin B_{12} supplemented soy bean protein being 48.6 ± 0.9 and 77.6 ± 1.8 respectively). This would suggest that vitamin B_{12} has overcome the adverse effect of the proteolytic inhibitor and soyin. These studies were extended to determine the effect of vitamin B_{12} on the biological value of autoclaved soy bean meal. These observations are presented here.

Cold defatted and autoclaved (at 15 lb. pressure for 30 min.) soy bean meal, at 10 percent protein-level in the diet, was used for the determination of biological value by the method of Mitchell. There were three comparable groups of albino rats, containing six rats in each group and each rat weighing 80-100 gm. After determining the endogenous nitrogen with 4 percent egg protein, one group (A) was given the basal diet containing the autoclaved soy bean meal, the second group (B) was given the same basal diet with vitamin B_{12} at 50 µgm. per kilo of the diet and the third group (C) received the basal diet with aureomycin at 200 mgm. per kilo of the diet. The figures for the biological values for the A, B and C groups were 78.30 ± 0.3, 85.40 ± 1.0 and 86.43 ± 1.40 respectively. These data clearly show that vitamin B_{12} has a definite function in increasing the utilization of soy bean protein irrespective of the extent of heat treatment. This observation is contradictory to that of Frolich who,

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were also found in the lumps. The clear crystals were identified as magnesium ammonium phosphate.

Buyers for this lot of ambergris were limited in number and highly discriminating. Acceptable ambergris ranges in value from $10 to $50 per pound. Lighter colored, almost white, material commands the highest price, particularly if it has been naturally weathered.

6.192

using chicks, did not find vitamin B_{12} to have any beneficial influence on growth with adequately heated soy bean meal. Our results also indicate that aureomycin exerts a significant increase in the biological value of autoclaved soy bean meal.

It was of interest to find out whether an animal protein, like casein, would respond to vitamin B_{12} in the presence of proteolytic inhibitor and soyin. Each of three more groups of rats received 10 percent casein in the basal diet in place of soy bean meal. Three lots of crude and active inhibitor preparation were made from soy bean the quantity of which was the same as that which formed the 10 percent protein level in the original basal diet. One lot of the inhibitor preparation was inactivated by heat and added to the control group of rats. The other two groups received the active inhibitor preparation. To one of these two groups, vitamin B_{12} was added at a level of 50 μgm. per kgm. of the diet. The following biological values were obtained: casein plus inactivated inhibitor, 86.6 ± 1.14, casein plus active inhibitor, 76.67 ± 0.82, casein plus active inhibitor plus vitamin B_{12}, 85.19 ± 0.98.

In the above case, vitamin B_{12} has just counteracted the influence of the inhibitor and has not shown any extra benefit. Whereas with raw soy bean, elimination of the adverse effects of the inhibitors automatically improves the biological value as evidenced by autoclaving the raw soy bean meal, in the case of the casein inhibitor the removal of the inhibitor effect by vitamin B_{12} has resulted in the restoration of the normal biological value. With a higher concentration of vitamin B_{12} in the diet than used in the present studies, it might be possible to get a higher biological value for casein as reported by Kon and Henry. This aspect is being verified.

Studies on the rate of release of certain amino acids from raw soy bean under the influence of vitamin B_{12}, and nitrogen balance and growth studies with different levels of autoclaved soy protein with and without vitamin B_{12} and aureomycin, are in progress.

6.14 (Cross References: 7.53, 7.777, 7.872, 6.139)

Fat extracted from the meals by a modification of the Stansby-Lemon cold shaking procedure was used for iodine value and peroxide number determinations. Typical results of peroxide value determinations on a herring meal are as follows:

Time elapsed from production, hrs.	Temp. in center of bag °C.	Peroxide value of meal fat	Temp. in center of bag °C.	Peroxide value of meal fat
0	22	2.4	22	2.5
2 1/2	26	15.4	25	16.1
6 1/2	28	26.3	27	23.9
12 1/4	28	25.1	28	25.0
16 3/4	30	25.0	30	25.2
22	30	24.8	29	29.8
27 1/2	28	26.0	28	31.2
98 1/4	14	35.8	13	41.7

Peroxide values were higher on oils extracted from meals having low moisture contents.

Fat was determined in fish meals in a variety of ways with results as follows:

(Continued on card 2)

6.14 (Cross References: 7.53, 7.777, 7.872, 6.139)

The Rosenmund-Khunhenn method gave higher iodine values than did the Hanus method.

2.3 FILLETING MACHINES SPEED FISH PROCESSING

Anonymous
Food Packer 35, No. 8, 54 (August 1954)

An Aberdeen, Scotland engineering company has over the past few years developed several pieces of equipment for the mechanical processing of fresh and frozen fish. Those in use in the United States include a long-fillet skinner, a standard mackerel processor, and a herring filleter.

The automatic long-fillet skinning machine is designed to handle all varieties and sizes of fish, cutting long fillets from 10 inches to 40 inches in length, without sorting for sizes, at a rate of 30 fillets a minute. The skinning knife may be adjusted with great accuracy to within a few thousandths of an inch.

The mackerel machine is designed to dress mackerel and certain species of fresh-water fish from 6 to 14 inches in length, without sorting for sizes, at a rate of 40 fish a minute. The head is cut off, the body cavity opened, and the entrails removed -- all automatically.

The herring filleter is a new, completely automatic machine that handles all varieties of herring and pilchards from 6 to 12 inches in length, whether fresh or salted, full or spent. The machine is designed to process three distinct products: (1) It removes the head and takes out the entrails without opening the body cavity, leaving the fish ready for canning, freshing, or for smoked buckling; (2) it removes the head, opens the body cavity and completely cleans it, leaving the fish ready for smoking as a buckling, for marinating as a bismarck, or for sale as a cleaned fresh or frozen herring; and (3) continues the process listed under (2) by splitting the herring from the tail to the vent on either side of the backbone and then removes the entire backbone with ribs attached. The filleted, boneless

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 ABSTRACTER: Roy C. Stevens

2.3 NEW, AUTOMATIC SHRIMP DEVEINING MACHINE

Anonymous
Fishing Gazette 71, No. 8, 94 (August 1954)

A recently introduced automatic shrimp deveining machine is said to hold promise for increasing the production of deveined and peeled shrimp meats and for encouraging greater use of peeled-deveined meats by the various canning, packaging, and freezing elements of the shrimp industry.

The new machine, by an automatic, controlled feed is capable of handling and deveining in a single operation, simultaneously, all commercial sizes of shrimp from the jumbo classification down to those running as many as 100 to the pound. The peeled meats are lifted via a screw-type elevator assembly and dropped onto a chute which is equipped with a series of positioned and long razor-sharp blades. The cut meats then pass to an automatic measuring device. Once measured, they go into a large horizontal deveining-washing tumbler where they are spray-washed, emerging completely deveined.

It is anticipated that expanded uses of the deveined meats will be found among canners of specialty items in the canned shrimp and seafood soup lines, breaders, packagers of shrimp cocktails, and bulk users of shrimp in general.

The machine is capable of deveining from 1,200 to 1,400 pounds of peeled shrimp meats per hour in the larger sizes.

Installations are being made on a lease rental basis.

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 ABSTRACTER: Roy C. Stevens

3.231 HUMIDIFICATION OF COLD STORAGES

Lentz, C. P.
Canadian Journal of Technology 32, No. 4, 156-163 (July 1954)

The objects of this study were (1) to design a practical system for maintaining high relative humidity in frozen storage rooms, (2) to determine the operating characteristics of this system, and (3) to determine the effects of varying some of the operating conditions within the frozen storage temperature range.

Water vapor that had condensed out on the cooling coils was absorbed by a solution of ethylene glycol and water, recovered from a continuously operating ethylene glycol-water solution concentrator, and sprayed into the frozen storage room in the form of water vapor. By controlling the operation of the concentrator, any relative humidity up to saturation could be maintained. Figure 1 (this card, over) shows a schematic sketch of the main working parts of the system.

The effects of (1) rate of moisture circulation, (2) concentration of the ethylene glycol-water solution, and (3) rate of air flow on relative humidity were examined in three series of tests. In test 1, moisture return to the frozen storage room was varied between 60 and 100% relative humidity with the solution maintained at 49% by weight concentration and the air flow at 1,000 c.f.m. In test 2, the solution concentration was varied between 43 and 56% by weight with relative humidity at 70% and air flow at 1,000 c.f.m. In test 3, the rate of air flow was varied between 600 and 1,800 c.f.m. with relative humidity at 70%.

Although every effort was made to conduct the experiments at 0°F., the temperature varied with the rate of humidification, fan power, and solution spray-pump power; therefore, all of the results

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 ABSTRACTER: Martin Heerdt

2.1121 NEW PLASTIC FLOAT FOR DEEP WATER

Anonymous
Southern Fisherman 14, No. 7, 149 (July 1954)

A Florida company has developed a new plastic float that has been tested and found to stand up at depths of 1,000 feet or more. It is made of pure virgin high-impact polystyrone and is said to have unusual toughness.

According to the manufacturer, the secret of the float's strength is its true elliptical shape. Since it is curved all the way up to the bulkhead, there is no flat surface anywhere, especially across the center where the strain is very great. Each float is 8 inches long, 5 inches in diameter, and has a 7/8-inch hole for hanging. The sturdy center bulkhead adds greatly to the strength of the float.

Before it was placed on the market, exhaustive tests were said to have been conducted for more than a year to determine the adaptability of the new float to deep sea fishing.

 ABSTRACTER: Roy C. Stevens

NEW FILLETING MACHINES

HUMIDIFICATION OF COLD STORAGES

SHRIMP DEVEINING MACHINE

PLASTIC FLOAT FOR DEEP WATER

3.231

had to be adjusted to make them comparable at 0° F. In the tests made with different spray solution concentrations and air velocities, a constant rate of humidification was used.

The relative humidity in a test room (20 feet long by 10 feet wide by 10 feet high insulated with 8 inches of rock cork and located in a space conditioned to 70° F.) was found to vary linearly with the humidification rate. Increasing the relative humidity caused a 19% increase in the refrigeration load at 100% relative humidity, but no appreciable difference in the temperature between the air, the spray solution (ethylene glycol-water), or the cooling coils. The relative humidity in the test room decreased as the concentration of the spray solution increased, at a fixed rate of humidification. The relative humidity increased markedly with an increase in air velocity, although the increase was not as great as would be expected from the increase in spray temperature.

Maintenance of 100% relative humidity increased the refrigeration and power loads linearly by 34% and 92%, respectively. The increase in refrigeration and power load caused by the latent heat load due to humidification could be reduced by lowering the freezer room temperature or by decreasing the temperature difference between the freezer room and the cooling surface.

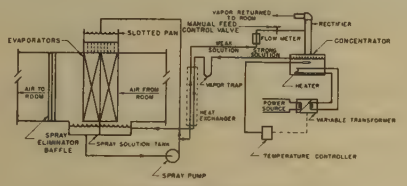

FIG. 1. Schematic sketch of humidification system.

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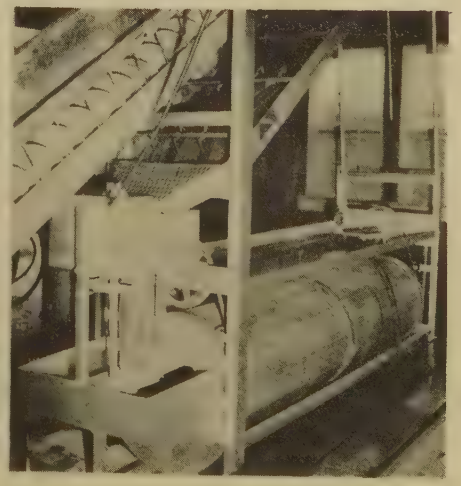
herring is now ready for canning or marinating as rollmops, or for smoking as filleted herring, or for offering as fresh or frozen filleted herring ready for cooking.

The machine requires only one operator. It is powered by a one-horsepower motor and requires only a one-half-inch water supply to turn out 40 fish per minute.

2.3 **(Cross Reference: 1.85)**



4.82 AMIF SETS PRINCIPLES FOR HANDLING AND MIXING OF FATS INTO FEEDS

Anonymous
National Provisioner 131, No. 7, 38-42 (August 14, 1954)

The American Meat Institute Foundation has recently published a manual on "Storage, Handling and Mixing of Fats into Feed" for users of feed-grade animal fats.

The manual points out that the most important considerations in determining the acceptability of the different grades of fat for feed use are palatability and stability.

All fats used in feeds should be stabilized with a suitable antioxidant to prevent rancidity development. As a rule, purchasers specify a stabilized fat when ordering from a supplier. However, if an unstabilized fat is purchased, it is a simple process to add the antioxidant to the warm liquid fat with vigorous agitation to insure thorough mixing. A 20-minute stirring period at 120° to 140° F. gives best results.

Stored fat must above all be kept dry. Both air and water adversely affect the stability of fat, but water is by far the most damaging. Clean, dry fat stored at ordinary temperatures in clean tanks will keep very well. Storage tanks should be completely emptied occasionally for cleaning and an opening large enough to admit a man should be provided for this purpose.

All piping, valves and fittings in contact with fat should be iron or steel. Brass, bronze or any other metal containing copper should be avoided because of the possibility of dissolved copper hastening the development of rancidity. All flanged joints in piping should be made up with asbestos,

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 ABSTRACTER: Roy C. Stevens

4.7 ECONOMIC STATUS OF THE FATS AND OILS INDUSTRY

Walsh, Robert M.
Journal of the American Oil Chemists' Society 31 No. 7, 27-29 (July 1954)

Fats and oils production from domestic materials increased from 8.7 billion pounds in 1937-41 to 12 billion pounds in 1953-54. Tallow and greases from animals and soybean oil, cottonseed oil, and linseed oil from vegetable sources were responsible for this large increase. Inedible fat production also has increased from about 1.3 billion pounds in 1937-41 to about 2.6 billion pounds for 1953-54. Some of the increase in the production of fats and oils has been offset by a decrease in the production of fish oils and butter. Fish oil production has decreased because of a near disappearance of the pilchard or California sardine which is found in the waters along the Pacific Coast of the United States. Soybean oil production, including the oil equivalent of exported soybeans, now amounts to over 2.5 billion pounds annually, or a five fold increase since 1941.

World production of fats and oils, as estimated by the Foreign Agricultural Service, increased by 13% from 1935-39 to 1953, an increase that was comparable to the increase in world population. World production of edible vegetable oils including cottonseed, peanut, soybean, sunflower, olive, sesame, and rapeseed increased 24% over prewar production, whereas world butter production decreased and lard increased from prewar. Except for a major increase in tallow and grease production over prewar (mainly in the United States), the trend in world production of the industrial oils -- linseed, tung, perilla, whale, and fish -- has been slightly downward. These oils have not expanded in line with population and industrial growth because of a lack of an increased need for them. Raw materials of non-agricultural origin, particularly petroleum derivatives, are tending to supplant the natural glycerides.

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 ABSTRACTER: Martin Heerdt

4.13 THE LIPIDS OF FISH. 5. THE LIPIDS REMAINING IN THE FLESH OF HADDOCK AFTER EXTRACTION BY ACETONE AND ETHANOL-ETHER

Olley, June and Lovern, J. A. (Torry Research Station, Aberdeen, Scotland)
Biochemical Journal 57, No. 4, 610-619 (August 1954)

Haddock flesh which had been extracted with acetone and ethanol-ether (3:1 by volume) at room temperature was further extracted first with boiling ethanol-benzene (2:1 by volume), then by boiling chloroform-methanol (1:1 by volume), and finally by pyridine at 100° C. Extractives so obtained were largely non-lipid; after purification by partition between chloroform and water, the remaining lipid material was found to be largely unsaponifiable material that was believed to be mostly waxes and hydrocarbons.

The composition of the lipids extracted from haddock flesh by procedures described in this and preceding papers of the series is as follows:

Substance	% total lipid
Lecithin	42.8
Unidentified lipid	15.2
Waxes and alcohols	10.5
Free fatty acids	6.1
Free cholesterol	6.1
Phosphatidylethanolamine	5.4
Inositol lipids	4.4
Cholesterol esters	3.4
Trigylcerides	2.4
Hydrocarbons, etc.	2.0
Plasmalogens	1.7

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 ABSTRACTER: M. E. Stansby

6.133 THE USE OF VARIOUS SOLVENTS FOR THE EXTRACTION OF OILS

Paquot, C. and Galletaud, C.
J. Rech. Cent. nat. Rech. sci., No. 20, 233-234; No. 22, 40-42, No. 24, 120-121 (1952, 1953)
Food Science Abstracts 26, No. 3, 274-275 (May 1954)

Dichloroethane was compared with petroleum ether and trichloroethylene as a solvent for soya bean oil. Oil was extracted at about the same rate with dichloroethane as with trichloroethylene, and rather more slowly with petroleum ether. Dichloroethane is more stable and more easily removed from the oil than trichloroethylene, and gives a lighter coloured oil; it is less inflammable than petroleum ether.

II. Linseed and Palm Kernels

With the solvents under investigation, the rates of extraction of oil from linseed and from palm kernels, and the yields of oil, were in the order: petroleum ether <trichloroethylene <dichloroethane; the acidities of the oils, and their contents of unsaponifiable matter, were in the order: petroleum ether < dichloroethane < trichloroethylene. Oils extracted with trichloroethylene were deeper in colour than those obtained with other solvents, probably because of changes occurring during the slower process of expelling this solvent.

III. Groundnuts and Rapeseed

From both groundnuts and rapeseed, dichloroethane extracted more oil than trichloroethylene, which in turn extracted more than petroleum ether. The chlorinated solvents, especially dichloroethane, extracted further normal oil from material no longer yielding oil to petroleum ether.

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The effect of various solvents in dissolving the components of haddock lipids is shown in the following tabulation:

Lipid	Acetone %	Ethanol-ether %	Ethanol-benzene %	Chloroform-methanol %	Pyridine %
Lecithin	88.5	9.8	1.6	0.07	0.03
Unidentified lipids	62.4	32.2	3.9	0.2	1.3
Waxes and alcohols	58.0	20.5	14.1	3.3	4.1
Free cholesterol	~100	----	----	----	----
Free fatty acids	~100?	----	----	----	----
Phosphatideylethanolamine	84.4	10.3	4.4	0.9	----
Inositol lipids	72.5	18.6	6.7	2.2	----
Cholesterol ester	~100	----	----	----	----
Triglycerides	96.5	----	3.5	----	----
Hydrocarbons, etc.	61.0	16.8	8.5	2.1	11.6
Plasmalogens	50.3	40.4	3.3	4.3	1.7

4.82

neoprene, or stainless steel gaskets. Hoses must be of neoprene or be neoprene lined.

Other points are discussed that concern only users of fats produced by the meat-packing industry.

4.7

Inventories of fats and oils in the United States were at a post-war high of 2.8 billion pounds on October 1, 1953, whereas a normal inventory would be 2.1 billion pounds. The two basic factors responsible for the present high-inventory position of domestic fats and oils are (1) the rapid recovery in the world production of edible fats and oils since the war and (2) the serious inroad that synthetic materials have made in the market for industrial fats and oils.

Production, import, export, and domestic consumption trends in the United States offer no promise of a substantial reduction in the high-inventory position in the immediate future. Lard production, which is now relatively low, will rise again with the beginning of fall slaughtering activities. Restrictions on 1954 cotton acreage and cottonseed oil production will be offset by increased soybean and flaxseed plantings. The domestic use of fats in foods has been rising in line with population increases, but industrial uses, particularly in the manufacture of soap, have been declining. The abundant supply of certain inedible fats presently available indicates the need for research to find new uses for these fats.

4.82 HOW MILL BLENDS FATS INTO ANIMAL FEEDS

Anonymous
National Provisioner 131, No. 5, 11-13 (July 31, 1954)

Feed efficiency gains have been reported from the use of fat-fortified animal feeds. Levels from 1.0 to 7 percent have been used, depending upon the end purpose for which the product is to be used.

The advantages accruing from the use of fats in feeds include increased palatability -- particularly in poultry feeds, and the elimination of dust in the feed blending operation.

The writer describes a feed mixing operation in which all the feed ingredients are scaled and then put into one of the firm's four-ton mixers. The proper percentage of fats is carefully weighed and placed in a 55-gallon steel drum. Mounted on the drum is a pump mechanism which pumps the fat from the drum into a 2-inch pipe which houses an electric heating element. By means of a by-pass valve the fat is recirculated within the drum until it reaches the desired temperature of 160° F.

When the proper temperature is reached, as indicated by a thermometer mounted on the by-pass pipe, the by-pass valve is closed and the flow-back valve is opened. The actual flow can be determined by means of the flow-back stem, which empties into the barrel. The amount of flow is controlled by opening or closing the by-pass valve. When the right rate of flow is reached, the flow-back valve is closed and the valve to the main feed mixer pipe is opened. The fat enters the feed mixer at the exact point where the feeds are cascaded. This results in an even distribution of fat within the mixer. However, the mixer is kept in operation even after the addition of the fat, until visual observation shows that thorough mixing has been attained. The coloring of the feed is said to

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 ABSTRACTER: Roy C. Stevens

6.72 PREPARATION OF COD LIVER RESIDUES AND VITAMIN B_{12} CONCENTRATES

Truscott, Beryl; Gage, D. G.; and Hoogland, P. L.
Journal of the Fisheries Research Board of Canada 11, No. 4, 355-361 (July 1954)

The cod livers used were never more than three days old, always in good condition; the tissues were firm and no spoilage was apparent.

Fresh residue was prepared by two methods: **(A)** 500 grams of liver was minced in an electric blender, then warmed in a water bath to 60° C. Approximately 5 cc. of 7 N sodium hydroxide was added to adjust the residue to pH 8.0-8.5. The mixture was then centrifuged, oil and residue collected, and the residue adjusted to pH 6.0-6.5 with 4 N hydrochloric acid. **(B)** 500 grams of liver was minced in an electric blender and warmed in boiling water until the temperature was 85° C. The sample was heated quickly in a pressure cooker to 10 p.s.i.g. (115.2° C.). The heat was turned off, and the sample allowed to cool to 100° C. The mixture was centrifuged while hot and the oil and residue collected. Comparison of results from the above methods showed that the removal of oil in **(B)** was slightly better than in **(A)** and that the vitamin A content of the oil from **(B)** was considerably higher. The riboflavin, niacin, thiamine, pantothenic acid and vitamin B_{12} contents of the residue from **(B)** were higher.

A drum dryer was used to dry the residues. Experiments showed that the vitamin B_{12} content was not affected by pressures up to 40 p.s.i.g., but that a better appearing product was obtained with lower pressures. Thus 20 p.s.i.g. was chosen for operation of the dryer. It was also found that adding 1 mg. sodium bisulfite per gram residue resulted in higher vitamin B_{12} contents.

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 ABSTRACTER: Neva L. Karrick

8.64 THE DISTRIBUTION OF VITAMIN B_T (CARNITINE) THROUGHOUT THE ANIMAL KINGDOM

Fraenkel, G. (University of Illinois, Urbana)
Archives of Biochemistry and Biophysics 50, No. 2, 486-495 (June 1954)

Among the various animal tissues for which the author reports carnitine content are the following from marine source.

Animal tested	Carnitine/g. dry tissue μg.
Mollusca	
Pelecypoda	
Ensis directus, foot	875
Same, foot	560
Venus mercenaria, mantle	175
Same, foot	175
Same, foot	70
Same, adductor muscles, striated	1120
"	440
"	2240
Same, adductor muscles, smooth	1120
"	440-880
"	2240
Gastropoda	
Busycon canaliculatum, hepatopancreas	2240
Same, foot	560
Same, foot	1120
Cephalopoda	
Loligo pealeii, mantle	560
Same, mantle	35-70
Same, fins	35
Same, arms	35
Same, neck muscles	175
Same, viscera	560-1120
Crustacea	
Decapoda	
Libinia emarginata, muscle	560-1120
Same, hepatopancreas	112-224
Pagurus pollicaris, hepatopancreas	1120
Arachnida	
Xiphosura	
Limulus polyphemus, muscles	35,000
Same, muscles	17,500

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 ABSTRACTER: M. E. Stansby

6.190 EFFECT OF EGG YOLK, FAT AND FISH SOLUBLES ON GROWTH OF CHICKS

Denton, C. A.; Lillie, R. J.; and Sizemore, J. R.
Federation Proceedings 13, No. 1, Part I, 455 (March 1954)

When male chicks (New Hampshire X Silver Cornish), on a corn, soybean meal alfalfa meal basal fortified with B vitamins, choline, methionine, antibiotic and arsonic acid, were fed fish solubles, lard or egg yolk weight gains of 9, 6 and 18% respectively over the basal were obtained at 4 wk. of age. The effect appears to be additive as feeding the combination of these materials resulted in 32% increase in weight over the basal. Female chicks of the same strain when fed these materials singly gave approximately the same responses as did the males. Vitamin B_{12}-depleted mixed Rhode Island Red chicks gave about the same response to lard and a larger response to yolk than the crossbreds. The Rhode Island Red chicks' response to fish solubles was small and irregular.

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Animal tested	Carnitine/g. dry tissue μg.	Animal tested	Carnitine/g. dry tissue μg.
Same, muscles	8800-35,000	Vertebrata	
Same, muscles	8800	Selachii	
Same, hepatopancreas	2100	Mustelus canis, muscle	700
Same, intestine	4400-8800	Same, liver	420
Tunicata		Torpedo occidentalis, muscle	350-700
Molgula manhattensis, viscera	35-140	Same, liver	26-52
Echinodermata		Same, electric organ	6500
Asteroidea		Same, electric organ	2240
Asterias forbesi, whole	35	Teleostei	
Same, hepatopancreas	175	Tautoga onitis (Tautog), muscle	224
Same, gonad	88	Same, liver	70
Echinoidea		Stenotomus chrysops (Scup), muscle	280
Echinarachnius parma, whole	Inactive	Same, liver	112
Holothuroidea		Same, testes	440
Thione briareus, whole	140		
Same, longitudinal muscles	280		
Same, cutis without muscles	35		

Assays were carried out by a procedure previously developed and reported by the author (Arch. Biochem. and Biophysics 34, 457 (1951) and Biol. Bull. 104, 359 (1953)). This procedure is based on the growth rate and survival of the larvae of the meal worm, Tenebrio molitor.

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indicate proper distribution. In addition, spot check samples are analyzed to assure constant fat levels as per formulation.

6.72

The dried residues became rancid after three weeks' storage at 1°C. Removal of fat from the residue by solvent extraction improved this situation. Acetone, ethyl ether, dichloroethylene, hexane and petroleum ether were tested. All solvents were practical, with hexane and dichloroethane most satisfactory.

Vitamin B_{12} from dried, defatted residue was extracted with water. The extract was concentrated by (A) lyophilization and (B) distillation in vacuo. Vitamin B_{12} losses were negligible for both processes. Distillation in vacuo was adopted for all further work.

All samples were analyzed qualitatively by paper chromatography. The drying or defatting did not alter the qualitative composition of the APF of the liver preparations. The presence of both vitamin B_{12} (cyanocobalamin) and of vitamin B_{12a} (hydroxocobalamin) was demonstrated. Other compounds with vitamin B_{12} activity were desoxyribonucleosides of the following purines and pyrimidines: thymine, uracil, hypoxanthine, xanthine and guanine.

3.19 NEW ELECTRON FOOD STERILIZER

Anonymous
Canner 119, No 4, 39 (July 26, 1954)

A new type of cold sterilization machine for food processing and other uses is being constructed by a California company. Plans have been drawn up for use of the accelerator in conjunction with the Martin Aseptic Canning System. This system features sterilization of product, container, and container cover, and filling, all within a closed aseptic system. It is planned to replace the thermal sterilizer unit in the Martin system with a radiation unit for the canning of heat-sensitive products. Radiation would be applied to a thin layer of the product as it enters the closed system on a conveyor belt.

It is believed that it will also be possible by this method to sterilize food products after packaging.

The unit is expected to be smaller, lighter, and less expensive than previous accelerators and should be applicable to medical and other uses as well as food processing. Because it is expected to be less expensive than other similar units, the manufacturers feel that it will be within the reach of large food processing companies who wish to experiment with its possible uses. The company's president states that the cost of preserving food by cold sterilization through radiation may ultimately be less than quick freezing.

 ABSTRACTER: Roy C. Stevens

3.230 FROZEN "FILLET BURGER" PACKED BY LOS ANGELES COMPANY

Anonymous
Pacific Fisherman 52, No. 10, 64 (September 1954)

A new patty product known as the "fillet fishburger" has recently made its appearance in the Los Angeles market. Intended primarily for the restaurant trade, the product offers complete portion control. It provides the chef with a patty all ready for grilling or deep-frying, with no waste.

The patties are being prepared from frozen five- and ten-pound blocks of cod. The frozen fish is first sliced, then ground, and the ground material is added to a batter mix and blended with egg, potatoes, seasoning, onion powder and cracker meal. The patties are molded in a press with an automatic paper feed that provides the waxed paper separations for each patty. Each is 3 1/4-inches in diameter, 1/2-inch thick and 2 ounces in weight.

After the burgers are partially cooked by a steam process, they are stacked six deep, and wrapped in vapor proof wraps, double-weight wax paper, four to a group. They are then packed twenty-four to a carton and sharp frozen.

The fillet fishburger also adapts itself well for the home freezer, providing the housewife with a product that takes only minutes to prepare.

 ABSTRACTER: Roy C. Stevens

3.234 FREEZING FISH AT SEA -- NEW ENGLAND. PART 8. SOME FACTORS AFFECTING THE SALT (SODIUM CHLORIDE) CONTENT OF HADDOCK DURING BRINE-FREEZING AND WATER-THAWING

Holston, J. and Pottinger, S. R. (U.S. Fish and Wildlife Service Technological Laboratory, East Boston, Mass.)
Commercial Fisheries Review 16, No. 8, 1-11 (August 1954)

A study of the various factors governing the penetration of salt into fish during immersion-freezing was conducted in connection with continuing research on the feasibility of freezing fish at sea for subsequent processing ashore. The following factors are reported on:

Brine temperature: The effect of brine temperature upon salt penetration into fish during an immersion-freezing process is shown in table 1. The salt content in the first quarter-inch of meat is seen to increase to a considerably greater degree with increasing temperature than that in the second quarter-inch. In all cases, the salt content of the second quarter-inch of meat is slight, and is well below the taste threshold (0.5 to 0.6 percent) for salt in fish. From the data it is apparent that the brine temperature should be held as low as feasible to minimize the rate of salt penetration during the initial periods of freezing.

Table 1 - Variation in Salt Content of the Meat of Round Scrod Haddock Immersed for One Hour in Sodium-Chloride (23 percent) Brine at Different Temperatures

Brine Temperature	Salt Content	
	In 1st $\frac{1}{4}$-inch of Meat	In 2nd $\frac{1}{4}$-inch of Meat
°F.	Percent	Percent
-6	0.37	0.15
0	0.51	0.19
5	0.55	0.24
10	0.64	0.23
15	1.15	0.24

Brine concentration: Brine concentration has been found to affect the rate of salt penetration during immersion-freezing. Scrod haddock held for 60 minutes in a eutectic (23 percent)

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 ABSTRACTER: Roy C. Stevens

2.01 THE BACTERIOLOGY OF DEHYDRATED FISH. II. THE EFFECT OF STORAGE CONDITIONS ON THE BACTERIAL FLORA

Shewan, J. M.
J. Hyg. 51, 347-358 (1953)
Food Science Abstracts 26, No. 3, 254 (May 1954)

Raw or cooked minced flesh from white fish was dried in warm air in the Torry batch kiln, and stored in tins, and the effects of different temperatures and humidities on the bacterial flora were investigated. Results with tins containing air and nitrogen were very similar. Counts of viable bacteria, made at 37° and at 20° C., showed a marked decrease, after 65 weeks, in fish stored at 37° and 20° C.; but in that stored at 0° and at −10° C., the counts remained approximately the same throughout storage. Before storage, 53% of the bacteria isolated from the dried fish and incubated at 20° C. consisted of Gram-positive cocci, and 43% of Gram-negative cocci; the corresponding figures for incubation at 37° C. were 95 and 2%. After storage for 65 weeks, the bacteria growing at 20° C. were 54% asporogenous rods, 43% Gram-positive cocci, and no Gram-negative cocci; the corresponding figures for incubation at 37° C. were 7.5, 31.5, and 59%. At temperatures of 37° and 20° C., visible growth of mould occurred after 62 weeks' storage at 65% relative humidity, and after 6 weeks at 75% relative humidity. At lower relative humidities, no growth of mould occurred. A maximum moisture content of 10% for dehydrated fish would prevent growth both of moulds and of food-poisoning organisms.

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sodium-chloride brine at 15° F. showed an absorption of 1.2 percent salt in the first quarter-inch of meat, whereas another sample, frozen under the same conditions in a 15-percent sodium chloride brine, contained 0.72 percent salt in the same level of meat.

Immersion time: The effect of the length of immersion period (up to 24 hours) for fish in brines of different temperatures is shown in table 2. The results of the tests of salt penetration into fish immersed in cold (5° F.) brine for prolonged periods (up to 12 days) are shown in tables 3 and 4 (omitted).

Table 2 - Variation in Salt Content of Meat of Round Scrod Haddock Immersed in Sodium-Chloride (23 percent) Brine for Differing Times and at Differing Temperatures

Immersion Time	Salt Content					
	5° F.		10° F.		15° F.	
	1st ¼-inch of Meat	2nd ¼-inch of Meat	1st ¼-inch of Meat	2nd ¼-inch of Meat	1st ¼-inch of Meat	2nd ¼-inch of Meat
Hours	Percent	Percent	Percent	Percent	Percent	Percent
1	0.55	0.24	0.64	0.23	1.15	0.24
2	0.91	0.31	1.10	0.26	1.27	0.26
4	1.22	0.20	1.29	0.24	1.49	0.21
24	2.09	0.84	3.02	0.93	5.15	3.01

Brine composition: The addition of small quantities of calcium (1 percent) and of potassium (0.6 percent) salts to a sodium-chloride brine retards the penetration of salt into the fish. The salt content in the first quarter-inch of meat of fish frozen in the modified brine was found to be 25 to 33 percent lower than in control fish frozen in the usual sodium chloride brine.

Eviscerated fish: Results indicate that if adequate supervision of immersion time and brine temperature are exercised, eviscerated fish could be commercially frozen in brine.

Leaching of salt during water thawing: The analyses show that excessive salt penetration did not occur in routine freezing operations. Penetration was restricted almost entirely to the first quarter-inch of meat during freezing under semicommercial conditions. The penetrated salt was leached out during water-thawing to such an extent that the final product had a bland or "flat" taste.

2.01 (Cross Reference: 3.64)

2.1121 BOTTOM TRAWL FOR HERRING FISHING

Maksheev, V. G. and Savrosov, V. K.
World Fishing 3, No. 8, 290-293 (August 1954)

Translated from the original Russian, this article describes in detail the construction of a 150-foot herring trawl.

The 150 ft. herring trawl consists of upper and lower halves. The upper half of the trawl consists of four basic parts: the upper wings, the square, the upper part of the belly, and the upper part of the cod end. The upper wings form a trapezoidal surface 46 meshes wide at the front and 148 meshes at the rear. The length of the upper wing along the sewn selvage is 204 meshes (42 ft.). The length of the wing along the hauling selvage is also 204 meshes (44 ft.). The size of the meshes when the whole net is extended is up to 70 mm. The first and last rows of the mesh are tied for strengthening with two-ply rope.

The size of the mesh in the square is also 70 mm. This also forms a trapezoidal surface, 346 meshes wide at the front and 252 meshes at the rear. The length of the square along the longitudinal side selvage is 138 rows (28 ft.). The first and last rows of the square surface, as well as the selvages of the upper wings are strengthened with two-ply rope.

Similarly, the lower wings have a mesh size of 10 mm. The width of the wing at the bosom end is 80 meshes, with a width at the front of 35 meshes. The length of the wing is 340 rows.

The belly, sometimes called in fishing practice the "single row purse", consists of two surfaces: upper and lower. The dimensions of both these parts are identical. Each surface of the belly in turn consists of 6 horizontal parts having various mesh sizes from 60 to 22 mm. The average length of each bosom surface is 32 1/2 ft.

The cod end consists of an upper and lower part of identical dimensions. The average mesh size along the whole length of the cod end is 22 mm. The length of the cod end is 55 ft. or 950 rows. The width of the cod end at the front is 200 meshes and at the rear 100 meshes. From the 150th row the

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 Reprinted in part

3.234 FREEZING GULF-OF-MEXICO SHRIMP AT SEA

Dassow, John A. (Fishery Products Laboratory, U.S. Fish and Wildlife Service, Ketchikan, Alaska)
Commercial Fisheries Review 16, No. 7, 1-9 (July 1954)

One solution to the problem of maintaining quality in shrimp caught in distant areas or on long trips in southern waters is to freeze the shrimp in low-temperature brine at sea and then thaw, package, and refreeze them ashore. The present study was a small-scale trial of brine freezing shrimp at sea in the coastal area of the Gulf of Mexico. Among the factors considered were: (1) quality of the fresh shrimp, (2) effect of chilling the shrimp before freezing, (3) freezing rate, (4) importance of brine circulation, (5) glazing, (6) storage of brine-frozen shrimp, (7) thawing and refreezing brine-frozen shrimp, (8) salt content of frozen shrimp, and (9) a comparison of keeping quality of brine-frozen shrimp with that of air-frozen shrimp.

Freezing trials were conducted aboard the FWS exploratory vessel Oregon during March and April 1952. Both the white (Penaeus setiferus) and brown-grooved (P. aztecus) shrimp were brine-frozen and air-frozen during exploratory trips off the Mississippi, Louisiana, and Texas coasts. Shrimp processed at sea were frozen either in refrigerated brine (85° salimeter) at 5° F. or in still air at -20° F. within two hours after being caught, with the exception of one lot of whole shrimp that was iced for three days prior to being headed and frozen. Air-frozen shrimp were prepared as the control sample and were packaged in 5-pound waxed cartons, placed in the sharp freezer at -20° F. for 24 hours, glazed with cold fresh water, and stored at 0° F. Organoleptic examination of the frozen, thawed, and cooked shrimp samples was made after 5, 8, 15, 26, and 40 weeks of storage at 0° F.

Headless shrimp frozen in brine showed no discoloration on the shell or the exposed meat. Flavor and texture of the cooked shrimp were normal, and little salt was absorbed by the meat during

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 ABSTRACTER: John A. Dassow

6.130 EXPRESSION OF OIL FROM DRIED FISH MEAL

Einarsson, Hjalti; Sinnhuber, Russell O.; and Worthington, Oliver J.
Journal of Agricultural and Food Chemistry 2, No. 18, 946-950 (September 1, 1954)

The reported work was carried out in an effort to find a better method of removing oil from fatty fish meal. The wet-press method, which is commonly used with fatty fish, has the disadvantage of removing soluble nutrients with the press liquid. The authors investigated the removal of oil from fish meal by expression in a hydraulic press.

The process consists of drying the meal to 5 to 9 percent moisture and then pressing out the oil to about 6 percent oil content. The work was done on a laboratory scale with several varieties of fish. Press efficiency, or the percent of the original oil removed by the press, was found to be a function of several variables.

The effect of temperature on the press efficiency was expressed in terms of oil viscosity (table 1). With regard to the effect of pressure, the size of the cylinder was found to be a factor. A wall effect, in which the flow of oil from the meal was restricted by the narrow and solid press cylinder was observed. When a larger press cylinder was used, higher pressure resulted in increased press efficiency.

The effect of dwell time (time of applied pressure) appears to follow an equation of the following kind: $E = a_1 \log T + b_1$ where E is the percent press efficiency, T is the dwell time, and a_1 and b_1 are constants depending upon the type of meal and its condition.

The moisture content of the meal was found to be a factor in the efficiency of oil removal, particularly at low moisture content and low pressure. It was found that, for good results, fish meal should not be pressed when the moisture content is below 5 percent.

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 ABSTRACTER: Roy C. Stevens

1.2 AMERICAN ANCHOVIES - AND HOW THEY ARE CAUGHT

Anonymous
Pacific Fisherman 52, No. 10, 32-35 (September 1954)

California anchovies have been fished commercially for many years. However, it was not until the failure of the sardine fishery in the mid forties, when canners required a substitute for an export pack, that anchovies achieved any major importance. Since that time, the growth of the fishery has been tremendous. In 1951, 2,216 tons were produced; in 1952, 26,888 tons; and in 1953, production reached 41,532 tons.

It is believed that anchovies were first canned in Monterey in 1946. During the following years, anchovies were also packed in San Pedro area canneries. Prior to this development, the anchovy production of the lampara boats was sold largely for bait purposes, fresh or salted. This species has always been heavily used for live-bait for sport fishing boats in Southern California. In Northern California, anchovies have customarily been salted. They have also been used to a considerable extent as ground "chum" for mackerel scoop boats and as cut bait for commercial hook and line fishing. Some of the production is frozen and used in the state fish hatcheries as supplemental food for trout.

The lampara net in use today for anchovies was designed primarily for sardine fishing by small boats. Recent modifications in this gear have made these nets similar to those used in bait fishing, only considerably larger. This gear can also be used for sardines and mackerel.

 ABSTRACTER: Roy C. Stevens

RUSSIAN HERRING TRAWL

EXPRESSION OF OIL FROM FISH MEAL

FREEZING SHRIMP AT SEA

AMERICAN ANCHOVY FISHERY

6.130

The difficulty of removing oil from meal was found to increase with the length of time the meal had been allowed to stand, even when stored under vacuum in a sealed container at 0° C. (table 2).

The oil expressed from dried fish was found to have a lower free fatty acid content than that remaining in the presscake. The expelled oil had a mean value of 4.99 percent free fatty acids as oleic and the residual oil 5.85 percent, the difference being statistically significant at the one percent level. Thus, the expressed oil was well below the 6 percent limit for good grade industrial oil.

The article is well illustrated with tables and figures. Twenty-five references are cited.

Table I. Effect of Temperature on Efficiency of Oil Expression from Turbot Meal

Temp., ° C.	Pressed Meal, % Oil	Efficiency of Oil Removal, %	Viscosity of Oil, Centipoises
30	9.76	84.1	30.5
35	8.00	85.6	25.2
56	6.61	88.3	11.8
79	5.92	89.5	6.0
102	5.46	90.3	3.9
124	5.24	90.0	2.9

Initial oil 37.5%; pressed 3 hours; pressure 1500 lb./sq. inch; 4-square-inch press cylinder.

Table II. Effect of Meal Age on Efficiency of Oil Expression from Turbot Meal

Run	Age of Meal, Days at 0° C.	Pressed Meal, % Oil	Efficiency of Oil Removal, %
I[a]	4	5.41	90.4
	13	5.92	89.5
	27	6.45	88.4
II[b]	4 months at room temp.	12.9	72.4

Pressure 1500 lb./sq. inch; sample 50 grams; 4-square-inch press cylinder; temperature 78° C.; pressed 3 hours.

[a] Oil 37.5%; water 8.6%. [b] Oil 35.7%; water 8.3%.

2.1121

cod end is braided down to a width of 100 meshes. On to the lower part of the cod end is attached a strengthening half-purse, 100 rows or 6 1/2 ft. long, woven from two-ply rope.

The upper and lower halves of the trawl are sewn together. In order to strengthen the net a top lift of "Hercules" 17 mm. cable is fixed on to the side seam. The head rope of the herring trawl is 150 ft. long, 98 ft. of which are along the net. It is made of either 18 mm. steel cellular cable or of 22 mm. "Hercules" cable. Metal floats of 200 mm. (8 in.) diameter are attached to the head rope, there being 15 floats on each wing. Thus, the number of floats on the herring trawl is almost three times less than the number used on cod trawls. This is because herring fishing is carried out at 3 1/2 to 4 knots: a large number of floats increases the resistance of the trawl and leads to the reduction of its vertical opening.

Moreover, to the angles of the collar of the head rope (that part of the head rope between the wings) special towing lines 23 ft. long are attached with securing ropes of cellular cable. Their other ends are attached to the rear kite. The rear kite is attached with 39 ft. towing lines to the forward kite. The forward kite is then attached by 153 ft. towing lines to the lifting brackets of the otter boards. All these towing lines are prepared from a metal-cored manilla rope, of an average diameter of 10 mm.

In order to distribute towing line tension uniformly during turning and circling and also to regulate slackness in them automatically, a special "sliding end", 16 ft. long, of 9.2 mm. steel cable is installed, to which the ring of the forward kite bridle is fastened.

The kite is about 4 ft. square and made of 18 mm. impregnated and painted pine planking. In order to give it an initial positive angle of attack five metal floats are attached at the front end of the kite. To attach the towing lines, the forward kite is fitted with special bridles, and to change the angle of attack it is fitted with "regulating ends". The fixed length of these "ends" is 1 ft. 9 in. against a general length of 3 ft. 3 in. The rear kite is attached to the towing lines with special hooks and clamps. This rig makes it possible to obtain a vertical trawl opening of approximately 13 ft. to 17 ft.

The ground rope for the herring trawl is prepared from steel cable parcelled with old rope and served with 3 in. tarred rope. To avoid it being torn away from the bottom it is weighted with bobbin weights averaging 220-260 lb., which are attached to the trawl.

Shooting and hauling the herring trawl differ very slightly in practice from cod trawling operations. The only difference in the working process is caused by the kites, which must be lifted on board when raising the trawl and lowered with the trawl by hand.

3.234 (Cross Reference; 1.85)

brine freezing. The tests have shown that several weeks' storage of the brine-frozen whole shrimp is quite practical. Brine-frozen shrimp must be very carefully protected from dehydration if quality is to be preserved for periods of 6 to 9 months. The loss in quality of the air-frozen shrimp under conditions of moderate dehydration was also of greatest significance and was the factor limiting the storage life of these samples to 9 months. Brine freezing shrimp at sea or thawing and refreezing such shrimp ashore resulted in a product of color, flavor, and texture comparable to air-frozen shrimp prepared from the same lot. The appearance of shrimp frozen at sea was far superior to iced shrimp because of the complete absence of black-spot discoloration. For refreezing, only the use of absolutely fresh shrimp and prompt handling during freezing, thawing, and refreezing will give the best results. To protect packaged glazed shrimp adequately from dehydration, the waxed carton should be wrapped with moisture-vapor-proof film.

The following procedure is recommended for commercial brine freezing and processing of shrimp:

Freezing Aboard Vessel: (1) Use only fresh firm whole or headed shrimp. (2) Chill shrimp in fresh ice water. (3) Freeze shrimp in a strong (sodium chloride) brine (85° salimeter or 22.4 percent salt) at 0° to 5° F. Circulate brine continuously during the freezing process. (4) Remove shrimp from the refrigerated brine immediately after they are frozen, but in no case allow them to remain in the refrigerated brine longer than 4 hours. Rinse briefly in cold fresh water. (5) Store the brine-frozen shrimp at temperatures no higher than +5° F., preferably lower. Protect from dehydration during storage.

Processing Ashore: (6) Thaw brine-frozen shrimp in running cold water at 60° F. (about 10 to 15 minutes). (7) Remove shrimp from thawing tank. Remove heads from whole shrimp. Rinse and cull unsound shrimp. (8) Pack uniformly in waxed cardboard cartons with a minimum of head space. Overwrap with a moisture-vapor-proof film. (9) Refreeze shrimp at -10° F. or below and store at 0° F. or below.

0.33 SOME OBSERVATIONS ON THE BROWNING REACTION BETWEEN GLUCOSE AND AMMONIA

Hough, L.; Jones, J. K. N.; and Richards, E. L.
Chemistry & Industry, No. 19, 545 (May 8, 1954)

Glucose in aqueous ammonia at 37° develops a dark brown color which is due mainly to the formation of water-soluble materials of high molecular weight.

0.38 MUSCLE RIBOSIDE HYDROLASES: PREPARATION AND PROPERTIES

Tarr, H. L. A.
Federation Proceedings 13, No. 1, Part I, 309-310 (March 1954)

(Abstract of this article appears under 6.69 page 3 - October 1954 issue)

0.37 THE WATER-BINDING CAPACITY OF DEAD MAMMALIAN MUSCLE. I. EFFECT OF pH ON THE WATER BINDING OF GROUND BEEF MUSCLE

Hamm, R.; Grau, R.; and Baumann, A.
Biochem. Z. 325, 1-11 (1953)
Chemical Abstracts 48, No. 8, 4608 (1954)

The water-binding capacity of muscle is parallel to its swelling capacity in relation to the pH, the min. being in each case at pH 5 (isoelec. point of actomyosin). For ground muscle the water-binding min. shifts to higher pH levels with increasing addn. of water. The water-binding capacity increases with increasing addn. of water on the acid side of the isoelec. point but decreases on the alk. side.

0.39 SURVIVAL OF TISSUES AT LOW TEMPERATURES. THE USE OF GLYCEROL FOR PRESERVATION OF LIVING CELLS AT LOW TEMPERATURES

Smith, A. U.
Proc. Roy. Soc. Med. 47, 57-60 (1954)
Chemical Abstracts 48, No. 8, 4620 (1954)

0.39 REACTION OF SALMINE WITH OVALBUMIN, HEMOGLOBIN, INSULIN AND CASEIN

Ross, Victor
Archives of Biochemistry & Biophysics 50, No. 1, 46-54 (May 1954)

0.39 HYDROGEN-ION ACTIVITY AND PRECIPITATION OF BOVINE SERUM ALBUMIN AND β-LACTOGLOBULIN WITH SALMINE

Ross, Victor
Archives of Biochemistry & Biophysics 50, No. 1, 34-45 (May 1954)

0.39 BIOPHYSICAL ASPECTS OF THE FREEZING AND THAWING OF LIVING CELLS

Lovelock, J. E.
Proc. Roy. Soc. Med. 47, 60-62 (1954)
Chemical Abstracts 48, No. 8, 4620 (1954)

3.4 WHERE THERE'S SMOKE

Anonymous
Gourmet 14, No. 9, 14 (September 1954)

The article describes the construction of smokehouses and the smoking of meats and seafoods including shrimp, butterfish, and oysters.

3.4 MICROBIOLOGICAL DETERIORATION OF FISH POST MORTEM, ITS DETECTION AND CONTROL

Tarr, H. L. A.
Bacteriological Reviews 18, No. 1, 1-15 (March 1954)

(Abstract of this article appears under 3.12 page 13 - July 1954 issue)

3.4 SMOKELESS SMOKING

Moldavan, Andrew
Can. Food. Inds. 24, No. 7, 22-3 (1953)
Chemical Abstracts 48, No. 3, 1598 (1954)

4.63 ANTIOXIDANT FOR VITAMIN A-ENRICHED MARGARINE. II.

Mori, Takajiro; Naito, Koji; Ozawa, Yasuro; and Kembo, Hiroshi
J. Japan Soc. Food Nutrition 5, 180-82 (1952-53)
Chemical Abstracts 48, No. 8, 4721 (1954)

Margarine prepd. from hydrogenated whale oil (78.0), coconut oil (7.5), and peanut oil (14.5%) emulsified with water (or one of the below-mentioned milk products) was enriched with vitamin A (I) concd. from cod-liver oil to make the concn. of I in the product 1000 International Units per g. The addn. of milk products was as effective in protecting I from oxidation as the use of synthetic antioxidants such as nordihydroguaiaretic acid and Pr gallate.

4.63 ROLE OF ANTIOXIDANTS DURING STAZILIBATION OF VITAMIN A IN SHARK-LIVER OIL

Kamath, G. G. and Magar, N. G.
J. Indian Chem. Soc. 30, 335-41 (1953)
Chemical Abstracts 47, No. 22, 12752 (1953)

The stabilization of vitamin A in shark-liver oils was studied with nordihydroguaiaretic acid (I), propyl gallate (II), 2,6-ditert-butyl-p-cresol (III), and butylated hydroxyanisole (IV), both solid and liquid forms. I and II effectively stabilized vitamin A as detd. by aeration and storage. III was only slightly less efficient while IV was inefficient.

6.237 INCREASING THE CONCENTRATION OF VITAMIN A IN DOGFISH LIVER OIL

Carmona, Jorge
Rev. fac. cienc. quim. 25, 55-63 (1950)
Chemical Abstracts 48, No. 12, 7257 (1954)

6.237 CONCENTRATION OF VITAMIN A IN FISH LIVER OIL WITH MIXED ALCOHOL OR FUSEL OIL-ALCOHOL MIXTURE

Abe, Yoshiro and Taguchi, Takazo
Japan. patent 1584 (May 6, 1952)
Chemical Abstracts 47, No. 16, 8327 (1953)

6.237 CONCENTRATION OF VITAMIN A BY SOLVENT METHOD. I. TREATMENT OF COD-LIVER OIL WITH FURFURAL AND METHANOL

Abe, Yoshiro
J. Chem. Soc. Japan, Ind. Chem. Sec. 52, 229-231 (1951)
Chemical Abstracts 47, No. 6, 2936 (1953)

7.6139 CHEMICAL DETERMINATION OF VITAMINS A AND D WITH ELECTROPHILIC HALIDES

Bruggemann, Johannes; Kraus, Walther; and Tiews, Jurgen
Z. anal. Chem. 141, 161-182 (1954)
Chemical Abstracts 48, No. 11, 6495 (1954)

III. Determination of vitamin A with ferric chloride
IV. Suggestions for the determination of vitamin A in biological material

7.6139 COLORIMETRIC AND FLUOROMETRIC DETERMINATION OF VITAMIN A IN FISH-LIVER OILS; CHROMATOGRAPHIC SEPARATION OF VITAMIN A AND NONVITAMIN A MATERIALS IN THE UNSAPONIFIABLE MATTER

Fujita, Akiji and Aoyama, Masataro
J. Biochem. (Japan) 40, 157-168 (1953)
Chemical Abstracts 47, No. 12, 6601 (1953)

7.6139 A NEW METHOD FOR DETERMINING VITAMIN A IN PREPARATIONS, CONCENTRATES, AND FISH OIL

Vendt, V. P. and Kusnetsova, L. M.
Ukrain, Biokhim. Zhur. 21, 218-226 (1949)
Chemical Abstracts 48, No. 11, 6497 (1954)

7.641 THE MICROBIOLOGICAL DETERMINATION OF VITAMIN B_{12} WITH THE GREEN ALGA EUGLENA GRACILIS VAR. BACILLARIS. III.

Heinrich, H. C. and Lahann, H.
Z. Naturforsch. 8b, 589-98 (1953)
Chemical Abstracts 48, No. 8, 4618 (1954)

7.641 A HIGHLY SENSITIVE SPECTROPHOTOMETRIC METHOD FOR THE MICROBIOLOGICAL DETERMINATION OF THE B_{12} VITAMINS WITH EUGLENA GRACILIS VAR. BACILLARIS

Henrich, H. C. and Lahann, H.
Z. Naturforsch. 7b, 417-18 (1952)
Chemical Abstracts 47, No. 5, 2301 (1953)

The extinction of alc. or acetone exts. of chlorophyll a + b of the alga is measured at the absorption maxima of 4320 and 6640 A. with a 436-mμ filter. The method is applicable to concns. of vitamin B_{12} between 0.001 and 100 γ/ml.

7.641 MICROBIOLOGICAL DETERMINATION OF VITAMIN B_{12} IN TUNNY-FISH LIVER

Buffa, Aldo
Conserve e deriv. agrumari 2, 73-77 (1953)
Chemical Abstracts 47, No. 22, 12762 (1953)

7.81 AMMONIA AND BACTERIA CONTENT IN DIFFERENT COMMERCIAL GRADES OF FRESH COD

Borowik, Jozef and Zaleski, Stanislaw
Roczniki Panstwowego Zakladu Hig., No. 3a, 331-337 (1953)
Chemical Abstracts 48, No. 9, 5392 (1953)

7.81 INDOLE AS AN INDICATOR OF DECAYING FISH

Wierzchowski, Jozef and Severin, Maria
Acta Polon, Pharm. 10, 161-168 (1953)
Chemical Abstracts 48, No. 9, 5392 (1954)

7.81 RAPID METHODS FOR THE DETERMINATION OF AMMONIA IN DECAYING FISH

Wierzchowski, Jozef; Borowik, Jozef; and Severin, Maria
Roczniki Panstwowego Zakladu Hig., No. 3a, 321-330 (1953)
Chemical Abstracts 48, No. 9, 5390 (1954)

7.81 TRIMETHYLAMINE IN DECAYING FISH

Wierzchowski, Jozef; Kasinski, Wladyslaw; and Drabikowska, Helena
Roczniki Panstwowego Zakladu Hig., No. 3a, 313-319 (1953)
Chemical Abstracts 48, No. 9, 5392 (1954)

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Food Research
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Foreign Commerce Weekly
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Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
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Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
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Modern Packaging
Modern Refrigeration
National Fisherman
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

8.42 FOOD COMPOSITION TABLES -- MINERALS AND VITAMINS -- FOR INTERNATIONAL USE

Chatfield, Charlotte
Food and Agriculture Organization of the United Nations, Rome Italy (March 1954) 118 pp.

(Abstract of this article appears under 8.0 page 1 - September 1954 issue)

8.42 THYROID HYPERPLASIA AND TISSUE IODINE CONTENT IN SPAWNING RAINBOW TROUT: A COMPARATIVE STUDY OF LAKE MICHIGAN AND CALIFORNIA SEA-RUN TROUT

Robertson, O. H. and Chaney, Albert L.
Physiol. Zool. 26, 328-40 (1953)
Chemical Abstracts 48, No. 10, 6030 (1954)

8.42 INVESTIGATIONS OF TRACE ELEMENT COPPER. I. DISTRIBUTION OF COPPER IN BIOLOGICAL MATERIALS

Sahai, K. and Kehar, N. D.
Indian J. Vet. Sci. 21, 235-43 (1951)
Chemical Abstracts 47, No. 6, 2779 (1953)

8.51 THE DISTRIBUTION OF INDISPENSABLE AMINO ACIDS IN THE TISSUES OF AQUATIC ANIMALS. I. TRYPTOPHAN AND ARGININE CONTENTS

Iwamura, Iwao and Yamade, Hidenari
J. Japan. Soc. Food Nutrition 3, 102-105 (1950-51)
Chemical Abstracts 48, No. 6, 3587 (1954)

When detd. by colorimetric methods, the tryptophan and arginine contents on moisture-free basis were, resp., muscle of sardine 1.83, 5.45; muscle of Raja 1.36, 4.49; muscle of plaice, 1.58, 4.70; viscera of sardine 1.30, 3.15; viscera of sea-eel 1.22, 3.89; viscera of porgy 1.32, 4.91; liver of Raja sq. 1.30, 2.99; liver of porgy 2.27, 4.70; muscle of macruran 1.47, 5.52; Venerupis sq. (shell removed) 1.60, 4.24; and Neptunus trituberculatus 0.98, 2.04%.

8.51 NONPROTEIN AMINO ACIDS IN THE TISSUES OF LAMELLIBRANCH MOLLUSKS AND AMONG WORMS. COMPARISON OF MARINE AND FRESH-WATER FORMS

Duchateau, Ghislaine; Sarlet, Henri; Camien, Merrill N.; and Florkin, Marcel
Arch. intern. physiol. 60, 124-125 (1952)
Chemical Abstracts 47, No. 17, 8914 (1953)

8.51 ELECTROPHORETIC DIAGRAMS OF FISH PLASMA

Drilhon, Andree
Compt. rend. 237, 1779-81 (1953)
Chemical Abstracts 48, No. 8, 4713 (1954)

8.59 THE CONSTANT PRESENCE OF CITRIC ACID IN THE CALCAREOUS SHELLS OF INVERTEBRATES

Creac'h, Paul V.
Compt. rend. 237, 944-46 (1953)
Chemical Abstracts 48, No. 12, 7210 (1954)

Citric acid (I) was detd. in the shells of 18 species of invertebrates, mostly of marine origin, by the method of Peynaud (C. A. 40, 6208) and values of 2-73 mg./100 were obtained. The amt. of I was not related to the aragonite or calcite structure of the $CaCO_3$ in the shells.

8.59 BROMATOLOGICAL STUDY OF WHALE MEAT

Valdivia, Andres Chavez
Anales fac. farm. y bioquim., Univ. nacl. mayor San Marcos 3, 94-98 (1952)
Chemical Abstracts 48, No. 9, 5391 (1954)

8.59 INTERNAL SECRETIONS OF THE INVERTEBRATES

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